

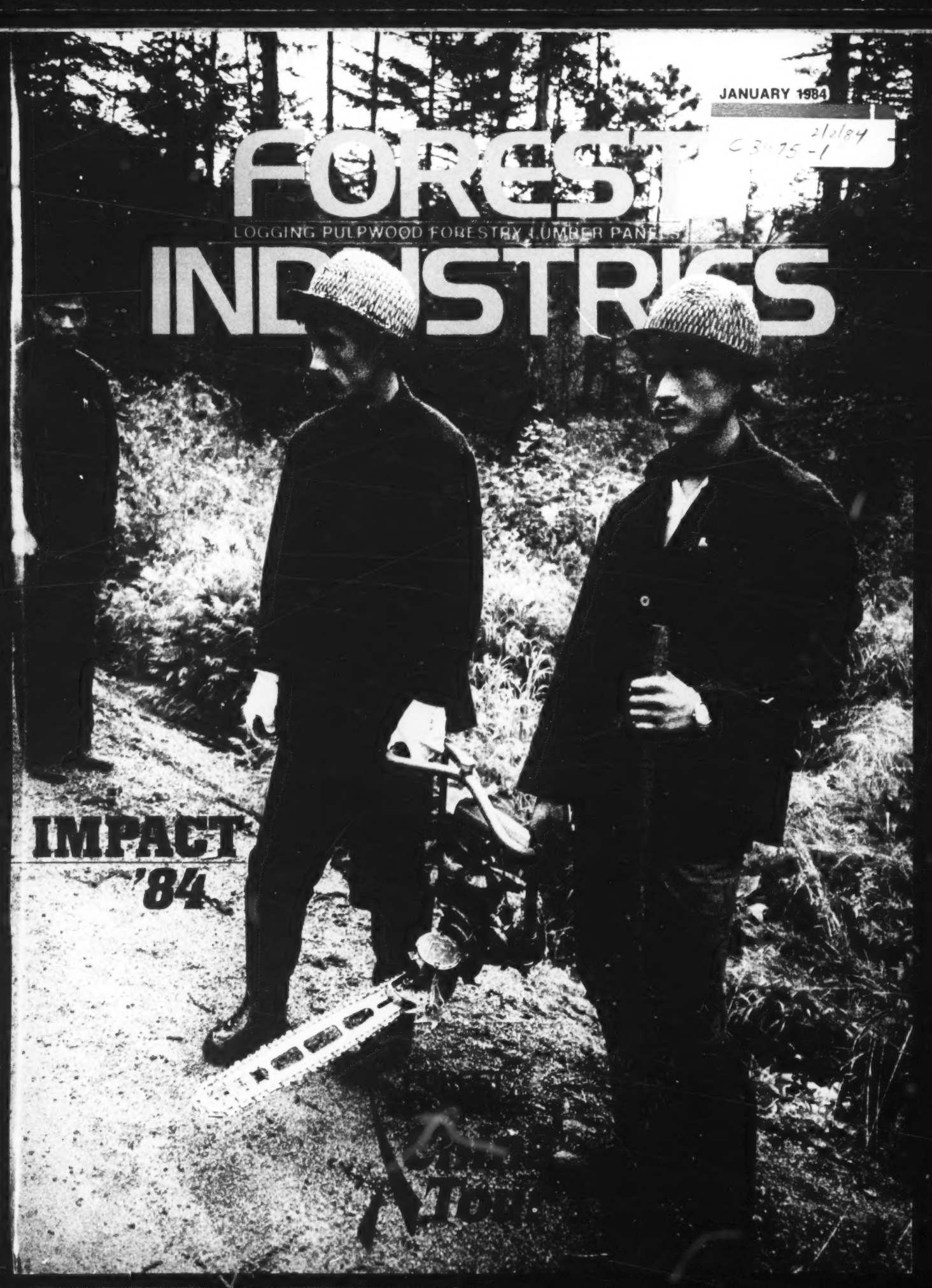
JANUARY 1984

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FOREST INDUSTRIES

LOGGING PULPWOOD FORESTRY LUMBER PANELS

IMPACT
'84



JANUARY

17

Changing roles of state and national associations

Associations at all levels are facing industry's demands for shared responsibilities among groups

18

1984 promises to offer a stable economy

If you liked 1983, you won't mind 1984. But look out for 1985 and beyond if Congress can't control deficits

20

It's 'heads-down' season—election time in Washington

Industry will fight familiar battles this year in Washington: deficits, interest rates, wilderness, and timber supply

22

Landowner motivation slows growth on NIPFs

Complex issues surround the problem of productivity on non-industrial private forest lands (NIPFs)

25

Investments needed now to assure future wood supply

A background paper on non-industrial private forest lands provides insight into their management and ownership

26

American Tree Farm System continues to flourish

Nearly 50,000 landowners are part of today's American Tree Farm System

10

Touring China's forest industry: a look at Heilongjiang province

Part 1 of a three-part series that details a two-week FOREST INDUSTRIES tour of China's forest products industry



30

'Wood Safari' gives group look at Finnish technology

North American lumber and plywood people visited Finland to see the differences in wood processing techniques and technology

32

Versatility, balance make company crews successful

Georgia Forest Products, in Americus, Ga., depends on company harvesting to insure adequate supply

34

Mechanized, manual logging supplies 220,000 cunfts/yr

Supplying wood for Maleite Lumber Co.'s northern Ontario mills near Timmins is an undertaking that spreads out over a 50-mile radius

5

Washington

7

For the Record

41

Industrial Wood Energy

42

Tips from Tommy

43

Making Equipment Pay

44

Newsmakers

45

Meetings

46

Equipment

27

'Every ounce of fiber into a salable product'

New South Forest Industries southern pine mill in Conway, S.C., overcomes the infirmities of age by remodeling

The nearly 50,000 landowners in the American Tree Farm System are helping to meet the nation's increasing demands for wood and paper products

American Tree Farm System continues to flourish

Washington, D.C.

The American Tree Farm System, launched in 1941, is a nationwide program designed to encourage private landowners to manage their lands to produce continuous crops of trees. The program operates through 45 state Tree Farm committees under the guidance of the American Forest Institute. About 10,000 professional foresters—from industry, government and consulting firms—volunteer time to the program.

There are nearly 50,000 landowners in the system, with total acreage adding up to nearly 88 million acres.

Two grades of Tree Farmers exist in the system: "Certified" Tree Farmers are landowners who have carried out effective forestry work on a significant portion of their land; and "Pioneer" Tree Farmers are landowners who have demonstrated an interest in and commitment to forest management and a written plan, but they are still in the early stages of applying the recommendations.

Nationally, the Tree Farm System has been growing in number of tree farms at approximately 7% annually since 1981, with acreage increases of approximately 2% annually.

The South has the biggest Tree Farm program, with more than 27,000 tree farms and 50 million acres in the system.

As could be expected with a system this big, percentage growth has slowed down in the South. The fastest growing regions are now the Mid-Atlantic Region, which is adding tree farms at 14% a year, and the New England Region, growing at close to 10% a year.

There are 1522 industrial tree farms, holding a total of more than 65 million acres. About 94% of all land owned by the forest industry is in the Tree Farm System.

Most of the rest of the system is comprised of the approximately 45,000 individuals who hold a total of 10 million acres in the "5000 acres or less" category—with an average woodlot size of 228 acres.

Tree Farm Reinspections, 1975-1983*

Year	Reinspections Needed	Reinspections Completed	Percentage
1975	6333	4402	70%
1976	6499	4016	62%
1977	6735	5935	88%
1978	7751	6714	87%
1979	7342	6253	85%
1980	7782	7166	92%
1981	8277	6663	81%
1982	8942	8184	92%
1983	9600	—	—

* The goal is to reinspect each Tree Farm every five years to update information.

Analysis of the types of foresters doing Tree Farm inspections shows that industrial foresters have been increasing their involvement, but state foresters still conduct most of the inspections. In 1974, industry foresters were responsible for 28% of the inspections, and state foresters did 53%. At the end of 1982, the figures were 35% and 48%, respectively.

In the "all other" category (which includes association, consulting, extension, Soil Conservation Service, and U.S. Forest Service foresters), consulting foresters are increasing their involvement. The "all other" category dropped from 19% in 1974 to 12% in 1982.

To keep the Tree Farm System credible and up to date, the American Forest Institute has a goal of reinspecting each Tree Farm every five years.

This allows information to be updated, maintains contact with landowners and ensures that the system's statistics are accurate.

Records show that the number of "needed reinspections accomplished" has risen from 70% in 1975 to 92% in 1982. As the system has grown, the amount of reinspection work needed also has grown: 6333 reinspections were needed in 1975, and 9600 were needed in 1983.

The American Forest Institute added the Pioneer category to the Tree Farm System in 1979 to involve landowners

who have good intentions, but who have not yet accomplished the necessary forest management on their land.

Pioneer Tree Farmers are given five years in which to accomplish the foresters' recommendations to qualify for certified Tree Farm status. Certification may take place sooner if the work is completed earlier.

Tree Farm Committees keep in touch with Pioneer Tree Farmers through the American Tree Farmer magazine and State Tree Farm newsletters.

The Pioneer Tree Farm category has grown rapidly. At the end of 1979, the national total showed 133 Pioneers with 44,000 acres. At the end of 1982, there were 1200 Pioneer Tree Farms with 163,000 acres, an annual growth of more than 40% in numbers and 35% in acreage.

The Pioneer Tree Farmers are well spread over the regions of the U.S. with the Mid-Atlantic, New England, North Central and South all having similar numbers.

At the present rate of growth there should be more than 50,000 Tree Farmers managing close to 87 million acres of land next year, and another 10 years will bring the system to 100,000 Tree Farmers and close to 100 million acres. ■

—By Lester A. DeCoster

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APRIL 1984

FOREST LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS INDUSTRIES

1984
PANEL
REVIEW



New OSB plant uses
low-grade hardwoods

Panel Review

20

New OSB plant uses low-grade hardwoods

Martco Partnership's new oriented strand board plant in LeMoyne, La., is the first such operation on the East Coast to use low-grade hardwoods

24

Production records set for structural panels, MDF

The housing recovery was reflected in improved 1983 performance by U.S. panel makers. On the horizon: a leap in waferboard and OSB capacity

26

'Simplicity' is watchword for efficient panel-making

The Forex Panoform waferboard plant in Val d'Or, Que., is the first such operation to make use of a caulless system to carry mats into the hot press

28

Softwood plywood industry adapts to changes in logs, manufacturing and markets

The key to survival and growth of the 80-year-old softwood plywood industry is a willingness to innovate and change

40

Market expansion forecast for reconstituted boards

The reconstituted board industry is changing rapidly. Demographics and raw material costs make the U.S. Southeast a strong growth area

44

Cypress panels broaden specialty products line

State-of-the-art technology and experienced personnel prove the flexibility of Georgia-Pacific's southern pine plywood mill in Hawthorne, Fla.

Woods

47

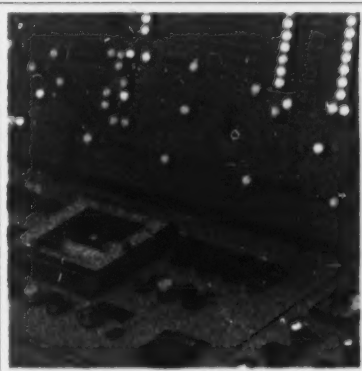
Skidding steep slopes: wide tires or fast track?

Wide-tired and fast-tracked skidders perform well against conventional machines, demonstrating operational and environmental advantages

48

Versatile family crew chips tidewater hardwoods

C. C. Sholar & Sons, a family chipping operation in Elizabethtown, N.C., maintains close management to keep overhead costs as low as possible



Cover story, p. 20

Departments

5

Washington

7

For the Record

11

Letters

51

Industrial Wood Energy

53

Tips from Tommy

56

Industry News

60

Making Equipment Pay

63

Equipment

67

Meetings

69

Newsmakers

Housing recovery, greater than anticipated, reflected in improved 1983 performance by domestic panel makers. On the horizon: a leap in waferboard and OSB capacity

Structural panels, MDF set production records

Atlanta, Georgia

It came as no surprise when U.S. panel production figures were totaled for 1983 that substantial gains were registered in all major categories, but the degree of improvement was generally greater than expected at the year's onset.

New volume records were established for structural panels and medium density fiberboard (MDF), underlining other evidence that the 12-month period indeed produced recovery from the catastrophic housing and wood products recession which preceded it.

Totals are contained in the table below. Percentage gains are:

- Structural panels, 27%.
- Particleboard, 22%.
- Medium density fiberboard, 36%.
- Hardboard, 31%.

Hardwood plywood production totals for the previous year are routinely unavailable at this time so the table runs a year behind.

The housing turnaround, stimulated by a descent of mortgage interest rates into the affordable range, was of course the greatest stimulus to increased panel output, although producers have continued their successful efforts to diversify markets.

Housing starts in 1983 reached 1.7 million units, a 60% improvement over 1982. For 1984, the National Assn. of

By David A. Pease

Home Builders forecasts 1.8 million units and the American Plywood Assn. foresees 1.75 million.

Structural panels soar

For structural panels, however, recovery is built on a different foundation than existed in earlier good times. The old record for softwood plywood/structural panels was 19.9 billion ft² (¾-in. basis) in 1978. Last year, softwood plywood alone accounted for about 19.6 billion ft² of a 20.8 billion ft² structural panel total, the balance representing the growing contribution of waferboard and oriented strand board (OSB).

Bronson J. Lewis, American Plywood Assn. executive vice president, elaborated: "Our 1978 record was predominantly influenced by the greatest-ever U.S. housing performance, 2.3 million units, which consumed 9.6 billion ft² or 48% of the 1978 industry total. This past year, starts were relatively healthy, but down almost 19% from 1978."

Last year's 1.7 million units consumed 8.35 billion ft² of structural panel products, indicating a healthy increase in the average volume per housing unit. Improved penetration of nonhousing markets was another major factor in the

different end use mix, Lewis pointed out.

Nonhousing markets are currently accounting for about 60% of structural panel demand.

Last year was a better year for the structural panel industry than was forecast 12 months ago. Then, APA was looking for a 1983 total of 18 billion ft², based on an expectation of 1.3 million housing starts.

APA economists are bravely predicting another record this year of 22 billion ft², up 5.7% from 1983, with incremental gains in all major end-use categories: homebuilding, distribution (including home repair and remodeling), industrial, nonresidential construction and exports. A downturn of 3.6% is seen in 1985, however, when decreased consumption in homebuilding is expected to depress structural panel production to 21.2 billion ft², still marginally better than 1983. The association's housing forecast for 1985 is 1.62 million units. The slide will be caused by higher interest rates, resulting from a heavier federal government demand on the money supply, which will again begin to disqualify buyers at the low end of the market.

"Should positive Administration steps be taken during 1984 to reduce expenses and balance the budget, the

TABLE 1—U.S. Panel Production, 1973-1983
(thousand ft²)

Year	Structural panels (¾-in. basis)	Particleboard (¾-in. basis)	Hardboard (¾-in. basis)	MDF (¾-in. basis)	Hardwood plywood (surface measure)
1973	18,304,599	3,493,648	6,475,387	—	2,048,362
1974	15,878,380	3,103,800	6,056,542	—	1,644,043
1975	16,050,180	2,538,934	6,237,906	215,496	1,279,592
1976	18,440,000	3,202,225	7,066,022	280,036	1,463,135
1977	19,376,000	3,592,910	7,200,000	441,354	1,478,000
1978	19,964,000	3,720,369	7,800,000	508,416	1,480,571
1979	19,653,000	3,376,488	7,687,798	506,728	1,434,521
1980	16,468,000	2,949,897	6,140,000	493,140	1,312,000
1981	17,023,000	2,869,352	6,104,000	516,102	1,270,220
1982	16,402,554	2,393,066	5,586,918	446,157	1,123,337
1983	20,821,342	2,919,544	7,302,702	605,098	Not reported

housing decline need not occur," pointed out Robert G. Anderson, APA director of market research and economic services, in the recently issued *Economics Report E-36*, an annual update that details structural panel markets.

Export shipments of 600 million ft² last year represented a modest 2.9% of the total, but growth expectations are high. APA in 1983 added a technical specialist in London and transferred other staff to new locations in Antwerp, Belgium, and Hamburg, West Germany. Export shipments should increase to 750 million ft² in 1975 (about 80% of which will go to Europe) and continue growing to 900 million ft² five years from now.

"The engine driving APA promotion in all markets is the integration of technical and market research with all other elements of the team, including quality assurance, field promotion and national advertising and publicity," Lewis remarked. "Encouraged by the panel industry's strong revival in 1983, we're building our promotional momentum with the objective of adding over 5.6 billion ft² of new demand to the total structural panel market by 1988." That would raise production above 26 billion ft².

Depending on whose ox is being gored, that margin is seen as being accounted for (a) partially, (b) wholly or (c) all and then some by the massive increase in waferboard and OSB capacity that is occurring on this continent. Improved manufacturing technology and market acceptance have advanced these products from a novel means of utilizing low-grade hardwood to a major factor in the structural panel market.

Some forecasters see this as a threat to softwood plywood products. APA's position diplomatically presumes that plywood, while not in line for any dramatic growth, will remain largely undisturbed and the new panels will satisfy the margin of consumption increase predicted.

Assuredly, a change in plywood product mix and distribution patterns will occur. (Elaboration on this point, and a review of emerging technology which will help keep softwood plywood manufacturing a viable institution, is provided on following pages by Champion International's Dick Baldwin. Also following: an overview of the reconstituted wood panel industry by Bill Pennington, Simons-Eastern's wood products manager.)

It is estimated that over 2 billion ft² of waferboard and OSB capacity may be added to the industry within the next two years, with major multiple-plant programs undertaken by Louisiana-Pacific Corp. and Georgia-Pacific Corp.

Canadian panel production jumps in '83

VANCOUVER, B.C.—Last year's economy must have brought brighter moods to a lot of people in Canada's panel industry. After the poor showing 1982's depressed markets caused, last year brought a substantial rebound.

The highest growth rate, however, a 75% increase in waferboard production, is not a "fair" statistic. New mills came on line during 1983, boosting Canada's capacity significantly.

Still, the figures look great: from total production of 492,447 m³ in 1982, waferboard output leaped to 863,442 m³. According to Statistics Canada, the waferboard figures include oriented strand board. (One cubic meter equals 35.3 cubic feet.)

Softwood plywood remains the dominant panel produced in Canada, and that industry recorded a healthy 23% growth. Production rose from 1.9 billion ft² (¾-in. basis) in 1982 to 2.33 billion

ft² last year.

British Columbia's Council of Forest Industries noted that 1.99 billion ft² was produced in B.C. last year. This is 85% of the national plywood production.

Slightly over 1 billion ft² was made of Douglas fir, almost all of this in coastal B.C. According to COFI, coastal B.C.'s plywood industry continues in a slump because both labor and log costs are so high the industry is facing severe competition from other regions.

The second category, called Canadian Softwood Plywood, or CSP, consists mainly of spruce and pine. Canadian plants turned out 1.3 billion ft² of CSP in 1983.

Particleboard production in Canada increased 28% in 1983 to 717,478 m³ from 561,873 m³ in 1982. Statistics Canada reported that hardboard mills made 577.8 million ft² (¾-in. basis) in 1983; 1982 output was not available. ■

G-P last year announced plans to build 10 OSB plants, starting with an expansion at Dudley, N.C. Others specified so far are 120 million ft²/yr facilities at Emporia, Va., and Grenada, Miss., for which ground was broken in January 1984. OSB startups in 1983 included Potlatch Corp., Cook, Minn. (its second), 155 million ft²/yr, and Martco Partnership, LeMoyne, La. (see story, pp. 20-23), 120 million ft²/yr.

L-P leads the waferboard sweepstakes with plans for six new plants, which will bring its total to 10. Spring 1984 completion dates have been placed against projects at Chilco, Idaho, 75 million ft²/yr, and Urania, La., 120 million ft²/yr (converted from particleboard). Others to come: Grenada, Miss.; Kremmling, Colo.; Oletha, Colo.; and Two Harbors, Minn. Fiber orientation machinery is being supplied to plants under construction.

Other panels show gains

Table figures (opposite) for 1983 show production increases over 1982 of 36% for MDF, 31% for hardboard and 22% for particleboard. This was the first time MDF output topped 600 million ft² (¾-in. basis), against a previous record of 530 million ft² in 1981. Capacity increases, less dramatic than waferboard and OSB, are under way in these categories as well.

In medium density fiberboard, L-P has a 50 million ft²/hr plant in Michigan's Upper Peninsula on the charts for completion in spring 1985; Montaña de Fibra has begun production at its plant

in Las Vegas, N.M.; Willamette Industries Inc. has converted from particleboard at Malvern, Ark.; and Masonite Corp. is converting some hardboard capacity at Towanda, Pa., to MDF.

Contributing to additional particleboard capacity are an addition at Ponderosa Products Inc., Albuquerque, N.M., and a plant that is under construction by Les Panneaux de la Vallée, Sayabec, Que.

Hardwood plywood gearing up

Hardwood plywood manufacturers have adequate domestic and imported supplies of prefinished, printed, vinyl laminated and paper overlaid panels to take care of the interior wall surface needs indicated by NAHB and Manufactured Housing Institute estimates for 1984, declared R. L. "Dick" Crutchfield, Hardwood Plywood Manufacturers Assn. board chairman.

There are 56 prefinishers of hardwood plywood in the U.S. and six in Canada, he said. Prefinished plywood shipments peaked in 1972 at nearly 6 billion ft² (surface measure); that figure dropped to 1.6 billion ft² in the depression year of 1982.

About 75% of the substrate is lauan from Southeast Asia, with Indonesia displacing Korea as the main supplier in the past few years.

HPMA members also produce laminated flooring, cut-to-size pieces, stock panels and veneer, those interests reflected in the association's divisions. HPMA also provides independent laboratory testing services. ■

The reconstituted board industry is undergoing rapid change. Demographics and raw material costs will make the Southeast U.S. a particularly strong growth area

Market expansion forecast for reconstituted boards

Atlanta, Georgia

A reconstituted board is a wood product that has been manufactured by reducing solid wood to a smaller component—particle, fiber, strand, flake, wafer, etc.—and then gluing the small components back together into a usable board product.

The reconstituted board industry is generally divided into two major classifications: structural and industrial. Industrial panels include particleboard, hardboard and medium density fiberboard. Variations of these basic products exist under other names such as flakeboard, thinboard, etc.

Structural panels include waferboard, oriented strand board and composite plywood, or com-ply. Generally, these products compete with plywood for their place in the market.

Some history

Hardboard was the first of the family of reconstituted board plants to become a major market factor. The growth of the hardboard market peaked around 1965 and the last plants were built around 1970.

This wet-process board had lost much of its appeal in new construction primarily because of three factors: 1) development of thin dry-board products; 2) environmental problems associated with a wet process; and 3) the increase in energy costs required to dry the product had become prohibitive.

Particleboard was the first of the dry reconstituted board products to be introduced. The development of particleboard began in earnest in Europe after World War II, but at least two plants were built in the U.S. in the mid-1930s. The massive expansion of the particleboard industry in the United States did not begin until the early 1960s. Production was less than 500 million ft² in 1960, $\frac{3}{4}$ -in. basis. This increased to over 3.5 billion ft² in 1972-73 before the last major slump in the industry. Particleboard production capability remains at about that level today. The majority of particleboard consumption remains in

By William H. Pennington

industrial uses, particularly the furniture industry, and in underlayment in new residential housing.

Waferboard, as defined by the Canadian Standards Assn., is a mat-formed panel product using wood particles having a length of at least 30 mm (1.2 in.) along the grain direction and a predetermined thickness. The wafer is essentially flat and has the grain of the wood in the plane of the wafer. The wafers resemble small pieces of veneer. Typically, wafers are from $1\frac{1}{2}$ to 3 in. square and .025 to .035 in. thick.

Waferboard was developed by Dr. James Clark in 1957 in Sand Point, Idaho. The product was primarily a $\frac{3}{4}$ -in.-thick panel used as a low-cost sheathing panel. Since that time, up until the recent past, the product has been essentially a Canadian product.

The history of waferboard capacity is shown in Table 1.

In 1981, approximately 50% of Canadian production was exported to the U.S. Operating efficiency in Canada was 70%. In the U.S., installed waferboard capacity is approximately 3% of installed capacity of softwood plywood. For North America, waferboard capacity is just under 10% of softwood plywood capacity.

Oriented strand board is a composite reconstituted board that attempts to capture portions of the market currently held by plywood and waferboard by duplicating the physical properties of plywood.

A patent was issued in 1961 to Armin Elmendorf for oriented strand board (issued in the U.S. in 1965). The new product did not develop until the most recent past, however, due partly to the low cost of plywood and technical difficulties, especially in properly orienting the strands.

The first pilot plant was built by Potlatch, followed by a commercial plant. The product was used almost exclusively to produce core panels for com-ply. The

second OSB plant, constructed by Georgia-Pacific in Dudley, N.C., was also used primarily for the manufacture of core for composite plywood. In 1981-82, three OSB plants were opened in the U.S. Total U.S. production today is more than 500 million ft², $\frac{3}{4}$ -in. basis.

Com-ply is a structural panel that is a combination of a reconstituted board core with a veneer cover top and bottom. Original tests beginning in the early '50s with com-ply used particleboard as the core. In today's context, however, com-ply is assumed to mean an oriented strand core with the orientation at right angles to the veneer. Generally, the veneer is oriented in the 8-ft direction of a typical 4 ft x 8 ft panel. Com-ply has equivalent physical properties as plywood made with the same veneers. A one-lathe, 100 million ft² ($\frac{3}{4}$ -in. basis) plywood plant can produce as much as 180 million ft² of com-ply with the same volume of raw material. The actual increase in volume will depend on the size and quality of logs used.

Medium density fiberboard (MDF) is produced by a process that ties together the technologies of hardboard and particleboard. The furniture market created by particleboard led to the opportunity for MDF. Furniture manufacturers required a panel with an edge that could be finished cheaply. They also needed a board without the problems associated with screw holding in both faces of particleboard. MDF solved both problems with a product that could be produced without the expense of plywood or solid wood.

The first MDF plant in the U.S. was a Pope & Talbot particleboard plant that used non-pressurized refiners and produced a 60 lb/ft³ panel. The screw-holding ability, and the ease with which edges could be routed and finished, made the board readily accepted by furniture manufacturers.

The advent of pressurized refiners has permitted a reduction in panel density to 45 lb/ft³ and less while retaining advantages in screw holding and finishing over traditional particleboard.

1984 PANEL REVIEW

Structural panel end uses

Residential construction has provided roughly half of the market for structural panels, plywood and reconstituted panels.

Other end uses are, in descending order: residential remodeling and repair, non-residential construction, the materials handling industry (including pallets and containers), and exports.

Thus far in this article, three structural panels have been introduced that have the potential for competing in many areas with plywood. Which of the three—waferboard, OSB or com-ply—will be the trend setter?

Pros and cons of com-ply

The first most obvious advantage of com-ply is that it looks, feels, smells and performs like plywood, a product that is universally accepted in the market place. Second, raw materials cost can be reduced significantly. This is especially true in view of the rapidly decreasing availability of large-diameter peeler blocks. The yield on a 24-in. average block is 60%. This drops to approximately 45% on a 10-in. average block. A recent plywood project that our firm worked on is sorting blocks of 7½ in. and larger to the plywood plant. Obviously, the yield from this size block is quite small.

The disadvantages of com-ply are equally obvious. Production of com-ply requires the use of two different technologies, plywood and reconstituted board, to produce one product. Capital costs and operating costs of such an operation tend to be greater, therefore, than the costs of a single product plant.

Feasibility studies conducted in recent years have indicated that the development of a com-ply plant can be justified under certain economic conditions. An example would be where a cross-oriented core-board plant is added to an existing, fully depreciated plywood plant which is experiencing high costs and insufficient availability of peeler quality logs.

Waferboard vs. OSB

Since waferboard was the first of the two new structural panels, it has developed some significant advantages. The major advantages are:

- It has known market acceptance.
- Its technology is proven.
- Product quality is proven.
- The cost of manufacturing is reasonably well established.

The major disadvantages of waferboard are:

- There are shortcomings in bending and stiffness properties and long-term durability.
- It is limited to certain wood species.

(Nearly all waferboard is produced from aspen.)

- Properties are limited by requirement for powdered resin.
- There are difficulties in producing and conveying wafer shape.

It may, of course, be possible to eliminate all of the disadvantages of waferboard by continuing research. These changes, however, will negate the major advantages of proven technology, quality and cost. Market acceptance conceivably could be affected as well.

The first disadvantage of OSB is the risk associated with technical and marketing aspects of introducing a new product. Technical risks are primarily concentrated in three areas: strand preparation, blending and orientation equipment. All of these areas are being worked on by equipment suppliers, research agencies and board producers. It is not likely that a perfect solution will ever be attained. However, it can be demonstrated that a superior board (compared with waferboard) can be produced without achieving perfect strands, blending or orientation.

A second major disadvantage is board appearance and market acceptance—OSB can look like inferior particleboard. This could prove to be a major detriment in attempting to develop the market. This is especially true in the do-it-yourself market that has been developed by waferboard.

Another possible disadvantage could be a potential increase in manufacturing cost due to increased resin cost. This can be disputed, however, since there are reasons to believe that the reverse may be true.

There are several potential advantages to OSB. The most obvious, and perhaps the most important, advantage of OSB is that there are increased physical properties. This is a distinct advantage in structural applications that are in direct competition with plywood. It is also true that it is possible to better control the strength properties of OSB. The possibility exists to "engineer" a board to meet differing requirements by varying resin content, strand size, density, orientation, etc.

Among the other possible advantages of OSB are:

- The ability to use liquid resins, while waferboard is currently limited to powdered resins.
- OSB can be produced using low-grade wood forms such as maxi-chips. This conceivably could eliminate on-site woodyards.
- OSB has a wider tolerance for moisture variations.
- High-density wood species can be turned into a good structural product at board densities of 45 lb/ft³ and less.

TABLE 1—Waferboard capacity

Year	Capacity U.S.	Capacity Canada
1957	25	—
1961	25	40
1969	25	100
1972	105	190
1975	105	500
1979	90	800
1980	90	1050
1981	550	1275

NOTE: Capacity is on ¾-in. basis in millions of ft³ per year.

- Conveying, storing, blending and forming of strands should be easier than for wafers.

Much of the technology developed for waferboard is transferrable to OSB. A considerable amount of experimentation is on-going to resolve the other problems. It appears the new structural panel, especially for the Southeast, is most likely to be OSB.

Two remaining questions that must be addressed are the costs of producing reconstituted boards and the market potential.

There are two principal cost factors: the capital costs required and approximate operating costs. Following is a series of "order of magnitude" estimates for the different boards.

Capital costs

Costs are based on a summary of various studies and actual plant costs. The following assumptions were used to develop cost estimates:

- Plants will be located in the southeastern U.S.
- Estimates are based on January 1984 dollars.
- Estimates are "order of magnitude" only and cannot be used for any specific project.
- Estimated site preparation costs are to cover a green field project and would include clearing, removal of overburden, site drainage, access roads, paving and rail spur.
- Estimated building costs include building foundations, floor slab and buildings.
- Estimated machinery costs include production equipment, electrical distribution, compressed air, heat generation and all services.
- Estimated installation costs include all charges for labor, tool rentals, temporary equipment and contractor overhead.
- Project management and engineering fees are a target estimate and include construction budget preparation, conceptual engineering, detailed engi-

neering, equipment specification, issuing tender documents, bid comparisons, expediting, site coordination, start-up assistance, and budget control.

• Contingency funds are estimated as 10% of the installed costs.

The estimated capital costs shown below are based on a plywood plant with an annual capacity of 100 million ft², 3/4-in. basis.

Site preparation	\$2,500,000
Buildings	3,900,000
Machinery	15,000,000
Installation	2,500,000
	<u>\$23,000,000</u>
Project management	1,700,000
Contingency	2,300,000
	<u>\$27,000,000</u>

This estimate is based on a single lathe and the associated matching equipment. All plant areas are assumed to operate at two shifts per day and 250 days per year except for the dryers, which operate three shifts per day. The capacity chosen was because this is the nominal production of a one-lathe plant.

The production of the plant could be increased by operating more shifts on all equipment except the dryers. To achieve greater production, additional funds must be included for drying equipment.

The estimated capital costs shown below are based on a waferboard plant with an annual production capacity of 226 million ft², 3/4-in. basis.

Site preparation	\$2,500,000
Buildings	4,500,000
Machinery	20,000,000
Installation	6,000,000
	<u>\$33,000,000</u>
Project management	2,500,000
Contingency	3,400,000
	<u>\$39,000,000</u>

This estimate is based on three shifts per day, 320 days per year. The basic equipment selected was three waferizers, two ring debarkers, two dryers, four blenders and a multi-opening press. The press is a 14-opening, 8x24-ft press.

The plant size and equipment selected is economically feasible in many manufacturing and market areas. It is likely, however, that a smaller size plant might be more feasible. Since each item of the basic equipment has more than one unit, it is practical to scale the plant down to a smaller size. The cost savings are, of course, not linear, but capital costs savings could be realized in most plant areas.

The estimated capital costs shown below are based on an oriented strand board plant with an annual production capacity of 226 million ft², 3/4-in. basis.

Site preparation	\$2,500,000
Buildings	4,500,000
Machinery	21,000,000
Installation	6,000,000
	<u>\$34,000,000</u>
Project management	2,600,000
Contingency	3,400,000
	<u>\$40,000,000</u>

This estimate is also based on a three-shift, 320-day schedule. The equipment is virtually the same size as that for waferboard, so again it would be possible to reduce the size of the plant and reduce capital costs.

There is considerably less experience with installation of OSB plants, so more caution should be exercised in using these numbers.

Operating costs

Operating costs of southern plywood plants can vary substantially depending primarily on the cost of the raw material. The wood cost is typically 60% of the total panel cost, and most projections indicate that this percentage could be as high as 70% of the total in the near future.

Wood cost in a waferboard or OSB plant, on the other hand, can be 25 to 30% or less of the total panel cost.

The cost of resin and wax is obviously higher in reconstituted panels. The net difference in operating cost in a plywood plant can be as much as 30% in favor of the newer panels.

Historical operating costs of waferboard plants in the Southeast are limited at best, and operating cost data for OSB plants are virtually non-existent. It is generally assumed that operating costs for the two products will be virtually the same. If mixed southern hardwoods can be successfully used in the manufacture of OSB, the scale will likely be tipped in favor of OSB.

For all practical purposes, then, it may be said that capital and operating costs for a new waferboard or OSB plant using today's technology will be roughly the same. Both are very competitive in terms of cost when compared with new plywood plants.

The final area to be addressed is the near-term market potential for reconstituted board products.

Factors that will affect the market for structural panels, especially for the next 10 years, are demographics, interest rates, housing starts, size and type of housing, shifting of the wood products industry to the South, availability of raw material, non-residential uses, and other factors.

These variables will be briefly addressed before a forecast is attempted.

The emphasis here will be on the southeastern U.S.

Demographics

The largest population increases in the U.S. for the next 10 years is expected to be in the age group from 25 to 44. In fact, the National Assn. of Home Builders has projected that in the age group 25 to 34, there will be an additional 700,000 per year increase for the next 10 years. This is the age group that is most likely to purchase new homes.

There is also a well-documented shift in the U.S. population to the Sun Belt. By all projections, this should have created a tremendous boom in the housing market in the Southeast beginning in 1980.

However, over the last couple of years, demographics have not been the driving force; the unparalleled high interest rates have quenched the demand for housing to record lows. This in turn has led to a substantially increased demand for structural panels for remodeling and repair.

Interest rates

It is fair to say that no one projected that interest rates would increase to the levels that they did during 1980 and 1981.

Many experts did project that interest rates would increase and that the increase would affect the housing industry, of course, but none of the experts projected the depression that occurred.

What about interest rates over the next 10-year period? The most general consensus is that mortgage interest rates will remain at roughly 12 to 13% for the foreseeable future.

If interest rates remain on this level, housing will still increase at a relatively good pace because of the demand for new housing. For this analysis, it is assumed that housing starts will be at 1,750,000 in 1984, with a gradual increase to 1,930,000 in 1990.

Size and type of housing

In the late '70s, over 70% of all new housing was in single-family units. This decreased in 1981 to about 64%. Most people would agree that the pressures of higher interest rates and escalating housing costs will continue to drive the percentage of single-family units downward. We also have seen a reduction of the average size of the single family unit. From a peak in 1979-80, the average size has decreased by approximately 2%. Many have projected that this slide will continue and the total reduction could be 4% by 1990. Of course, many are also projecting that the typical American home of the future will be as small as 1000 to 1100 ft². While this is possible, it seems unlikely that such a dramatic change would occur in the foreseeable future.

1984 PANEL REVIEW

Shifting to the South

In 1965, approximately 3% of softwood plywood was produced in the South. By 1980, this percentage had increased to about 45% of the total plywood produced. This was just slightly lower than the 45.5% produced in the Oregon/Washington area. The remaining 9.5% balance included panels produced in the California and Rocky Mountain region, and the new structural panels.

The major problem facing plywood manufacturers in the Northwest is the accelerating depletion of the raw material, Douglas fir. The U.S. Forest Service estimates that companies are harvesting at a rate 2.5 times the forest growth. The Forest Service forecasts that the timber harvest from industry acreage will decline approximately 32% between 1976 and 1990, and another 20% drop is projected by the year 2000.

The amount of timber acreage sold by the Forest Service rose by only 10% between 1973 and 1980. Because of this supply and demand imbalance, bid prices at Forest Service auctions have advanced dramatically so that the cost of raw material in the West Coast area has more than doubled the cost in the South.

In addition to the cheaper timber, southern plywood manufacturers have access to cheaper labor and enjoy a closer freight haul to the growing Sunbelt area and to the mature but still substantial markets in the Midwest and the East. The 11 western states accounted for 26% of the housing starts in 1979 but produced 58% of the total plywood production.

It seems almost inevitable that a greater regionalization of the panel market will occur, causing a further erosion in demand for western plywood.

Availability of raw material

The availability of hardwoods as well as softwoods in the Southeast is ideal for increased production of structural panels. Hardwoods comprise more than half of the inventory of timber in the South, and about three-quarters of this inventory is in private ownership and thus immune to Forest Service actions. Although hardwoods comprise over half of the inventory, only 29% of the total output of timber in the South is hardwood. The growth-to-removal ratio for softwood in the South is 1.4, and for hardwood it is 2.3.

It is anticipated there will be increasing price demands on softwood for use in pulp and paper. This will, of course, also pressure the cost of plywood peeler blocks upward. The abundance of under-utilized hardwood is an ideal raw material for the new structural panels.

TABLE 2—Structural panels market projections*

	1984	1985	1986	1987	1988	1989	1990
HOUSING STARTS (thousands)	1750	1750	1785	1820	1850	1890	1930
Residential construction							
Single-family	4980	5040	5100	5150	5220	5280	5340
Multi-family	2390	2445	2500	2555	2610	2665	2720
Mobile homes	230	235	240	245	250	255	260
Total	7600	7720	7840	7960	8080	8200	8320
Remodeling	7400	7640	7880	8120	8360	8600	8840
Nonresidential construction	3080	3180	3280	3380	3480	3580	3680
Industrial	2920	3010	3100	3190	3280	3370	3460
Consumption	21,000	21,550	22,100	22,650	23,200	23,750	24,300
Exports	750	800	850	900	950	1000	1050
Imports	210	220	230	240	250	260	270
Production	21,540	22,130	22,720	23,310	23,900	24,490	25,080

* Panel consumption and production projections are given in millions of ft².

Non-residential uses

New housing construction is expected to take around one-third of the total structural panel supply. Remodeling and repair of existing structures has the same size market. This market is expected to grow at a rate of 6% per year. The other markets, principally non-residential construction, industrial, and exports, are also anticipated to grow over the next 10-year period, but not nearly as dramatically as that which should be experienced in residential housing and remodeling and repair of existing structures. It is expected there will be an approximately 3% annual increase in the use of structural panels for non-residential construction, 3% annual increase for industrial uses and a net 5% increase in exports. In 1979, the net exports of plywood were 402 million ft². The American Plywood Assn. projects that by 1985, the net exports could reach 750 million ft².

Market projection

Given the preceding if's, maybe's and assumptions, certain facts can be established regarding the market potential for structural panels. Table 2 shows projections for the total structural panel market through 1990.

Potential markets such as all-wood foundations have not been factored into these projections.

At first glance, it might appear that there is only a slight demand increase for structural panels through 1984. In 1979, the capacity for plywood and, therefore, essentially for structural panels, was 22.5 billion ft², 3/8-in basis. The increase in new plywood and structural panel plants, as well as modernization of existing plants, has increased this total to about 24 billion ft².

There are two factors that negate this apparent abundance of structural panel

capacity. The first is that almost 2.0 billion ft² of West Coast capacity has been permanently closed in the last two years. An additional 2.0 billion (and perhaps as much as 3.0 billion) ft² of West Coast capacity is expected to close in the immediate future. These closings are primarily the result of the shifting market, not the current economy. At least an additional 0.5 billion ft² of capacity has been permanently closed in the South.

This brings the net capacity down to approximately 19.5 billion ft². As noted earlier, plywood production has rarely exceeded 90% of reported capacity. Assuming that this 90% figure is maintained, the net production reduces to 17.5 billion ft².

This means that the structural panel industry will be in a squeeze for product as early as 1984-85. Certainly some of the increased production can come from modernizing existing plywood plants. More capacity will also come from structural panel plants that are already in the planning stage and from Canadian imports. Some of the "permanently closed" facilities, especially in the South, would possibly re-open if demand developed fast enough. The remainder must come from new plants.

Will this new production capability be plywood or reconstituted panel? This author projects that plywood will remain the dominant force in structural panels, but—due to reduced capital and operating costs—most, if not all, expansion in structural panels will come from reconstituted panels, particularly OSB.

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FOREST INDUSTRIES

LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS



**1984 ANNUAL
Lumber
Review**

**Remote chipping crew
needs strong field support**

Lumber Review

14

Lumber firms enjoyed '83, but '84 outlook is dimmer

In this year's Annual Lumber Review, we return to a listing of the top lumber producers in the U.S. and Canada. Both '82 and '83 production figures are given

Mills

26

Merchandising line reflects mill's aggressive position

Expanding into new markets helped C & S Lumber, Carthage, Ark., increase production and lower unit cost; smoother recovery has resulted

28

Redwood's many grades challenge coastal millers

Frequent modernization projects keep 25-year-old Georgia-Pacific mill in Ft. Bragg, Calif., competitive. Adjacent old sawmill cuts high-quality wood

Woods

13

Mechanic capability vital to remote chipping side

Terms for whole-tree chipping contract required working remote tracts, but J. K. Martin Pulpwood Inc., Winnfield, La., found a way to make it successful

24

Logger likes independence; contracts help him through the rough startup times

Dennis Douthit, Silverton, Ore., recently started his own logging business. He's been too busy to worry about the future



Cover story, page 24

Departments

5

Washington

7

For the Record

35

Industrial Wood Energy

36

Equipment

39

Machinery Row

40

Newsmakers

44

Meetings

Last year's housing recovery in the U.S. brought a smart rebound in North America's lumber production. Sawmillers now have to ask themselves if the 'party' is about over

Lumber firms enjoyed '83, but '84 outlook is dimmer

San Francisco, California

When reporting on the lumber industry's smart rebound last year from the recession, it hardly seems fair to note the chance that the party may be over. But with interest rates rising and lumber prices weak, it is at least possible that 1984-85 won't be as exciting as 1983.

Brought back by popular demand, FOREST INDUSTRIES' review of North America's top lumber-cutting companies shows that most of them had plenty to smile about last year. A 70% jump in U.S. housing starts spurred a remarkable rebound in lumber production.

Both American and Canadian sawmillers benefited. According to the National Forest Products Assn., U.S. sawmills churned out 31.4 billion bd ft last year (hardwood and softwood combined), a jump of 4.5 billion bd ft or 16.7% over 1982's depressed figures. Canada's increase was even more notable: 29%.

Canadian output rose from 15.75 billion bd ft in 1982 to 20.37 billion last year; the increase of 4.6 billion bd ft outpaced the U.S. The national figures were compiled by Statistics Canada.

Rounding up the production figures from the top lumber producers in both countries was, as always, a monumental task. It began several months ago when

we mailed questionnaires to 447 leading lumber producers in the U.S. and Canada. Companies that failed to respond were re-polled by mail. Then, if necessary, we hounded them by telephone.

Persistence paid off: we finally got figures from 408 companies. In the listing that follows, the 408 companies are ranked according to '83 production.

Only eight companies refused to give figures. Another 18 firms had shut down, gone out of business or been bought out since FOREST INDUSTRIES did its last complete survey in 1982. Eight more names on our list turned out to be divisions of other companies, so their totals are included with their parent firms'. Only five firms couldn't be tracked down.

Companies responding to our survey cut 93% of the lumber the NFPA says was produced in the United States last year—nearly 29.22 billion bd ft.

In Canada, our survey picked up 75% of Statistics Canada's figure, or 15.22 billion ft.

Overall, this survey accounts for about 86% of the lumber produced in North America last year.

We tried to include all the major North American producers in our survey, but we are certain we missed some. We invite anyone who spots omissions or

other errors to write to us.

We brought this exhaustive (and exhausting) survey back because so many readers protested when we had to drop it last year—a casualty of the recession. To make up for last year's missing figures, we asked companies to give us 1982 and 1983 production figures. Both are included in the listing that follows.

Anyone who expected a big surprise from the survey after a year's absence will be disappointed. Weyerhaeuser Co. is still Number One, and the far-flung firm's 33 mills still cut far more lumber (3.12 billion bd ft) than second-place Georgia-Pacific's 37 mills (1.8 billion). Louisiana-Pacific Corp. remained in third place with 1.68 billion bd ft cut in 66 sawmills.

In Canada, however, there has been a significant shakeup. MacMillan Bloedel Ltd., which held fourth place in North American lumber production in 1981, has dropped to ninth. The top Canadian producer last year was Canadian Forest Products (Canfor), which came in at fifth behind Champion International.

Although the top four producers are American, the Canadians showed their strength by taking most of the remaining spots in the top 15. Seven Canadian firms are clustered between the fifth and 15th spots on the list.

TABLE 1—United States Lumber Production

Year	Softwood Lumber Production, By Regions					Total Softwood Production	Total Softwood Consumption
	Southern Pine	Douglas Fir	Western Pine	California Redwood	Softwood Other		
1974	6.921	7.777	8.973	1.895	1.627	27.193	32.082
1975	6.967	7.134	8.445	1.690	1.475	25.711	30.308
1976	7.598	8.322	9.789	2.001	1.633	29.343	35.753
1977	8.239	8.796	10.305	2.000	1.643	30.987	40.079
1978	8.267	8.845	10.033	1.902	1.852	30.899	41.435
1979	8.211	8.427	9.780	1.818	1.915	30.151	39.353
1980	6.880	6.815	7.613	1.589	1.903	24.800	32.499
1981	6.143	6.270	7.147	1.452	1.745	22.757	30.161
1982	6.186	5.783	6.803	1.433	1.678	21.883	29.388
1983	6.637	7.646	8.548	1.566	1.361	25.758	35.695

Figures in recent years subject to revision.

U.S. housing starts, as usual, pulled up lumber production—especially of softwood. As starts jumped from 1 million in 1982 to 1.7 million last year, U.S. lumber consumption rose almost 20% to 41.34 billion bd ft. Canada supplied most of the difference between the U.S.'s production of 31.4 billion and consumption of 41.34 billion.

While Canadians were maintaining (or slightly increasing) their share of the American lumber market, another beleaguered segment of the industry made a comeback. Western U.S. mills sawed nearly 69% of the nation's softwood lumber in 1983. This brings the West's share back to the level it held in the mid-to-late 1970s.

Southern sawmills saw their share of U.S. lumber production dip from 28.3% in 1982 to 25.8% last year.

**Percent of softwood
lumber production**

	<i>South</i>	<i>West</i>
1974	25.5%	68.6%
1975	27.1%	67.2%
1976	25.9%	68.5%
1977	26.6%	68.1%
1978	26.8%	67.3%
1979	27.2%	66.4%
1980	27.7%	64.6%
1981	27.0%	65.3%
1982	28.3%	64.1%
1983	25.8%	68.9%

Figures above were calculated from NFPA reports. "South" refers to production volumes from the southern pine region; "West" is a combination of coastal (mainly Douglas fir), inland (mainly pine) and California redwood regions.

In Canada, the division is essentially British Columbia versus everyone else. The West Coast province produced 64% of Canada's lumber last year. Its output of 13 billion bd ft was up nearly 3 billion feet (29%) from depressed 1982 levels.

**TABLE 2—Canadian Lumber Production
Softwood and Hardwood, 1974-1983 (billion bd ft)**

Year	B.C. Coast	B.C. Interior	Total B.C.	East of Rockies	Total Canada
1974	3.405	5.378	8.783	4.763	13.546
1975	2.504	4.965	7.469	3.851	11.320
1976	3.988	6.757	10.745	4.779	15.524
1977	4.499	7.539	12.038	5.629	17.667
1978	4.803	7.742	12.545	6.432	18.977
1979	4.657	7.861	12.518	6.480	18.998
1980	4.252	7.727	11.980	6.923	18.903
1981	3.458	6.966	10.424	6.473	16.897
1982	3.170	6.939	10.109	5.887	15.996
1983	4.140	8.903	13.043	7.328	20.371

Source: Statistics Canada

The 1983 figure was a record, surpassing the 12.54 billion feet cut in 1978. Production jumped in both coastal and interior regions, but the interior increased its lead over coastal sawmills. The once-dominant coastal region cut only 31.5% of B.C.'s lumber last year. Since prices didn't keep up with volumes, the bottom line was still disappointing for many B.C. sawmillers.

According to B.C.'s Council of Forest Industries (COFI), 56% of B.C. lumber was sold in the United States last year—more than double the amount sold in Canada. (It's worth noting that U.S. housing starts were about 10 times more than Canada's.) Nearly half of this—3.56 billion bd ft—was shipped to the North Central and South Atlantic regions of the U.S.

From all of Canada, the U.S. bought nearly 11.95 billion bd ft of softwood lumber last year. This is 97% of all U.S. lumber imports.

American lumber exports were a far less significant factor. According to the NFPA, U.S. lumber producers sold 2.27 billion bd ft abroad last year. Of this, 664 billion bd ft (29%) went to Canada.

As a whole, lumber exports rose 12.3% from 1982 to 1983, while exports to Canada jumped 58.5%.

While interest rates remained reasonable, 1984 recorded a roaring rate of homebuilding. In February, the rate actually exceeded 2.2 million units a year, once all the seasonal adjustments were made. Even March's stormy weather put only a momentary crimp in the rate.

But when mortgage interest rates climbed over 14% in April and May, the rate of home building started down. Most analysts predict 1984 will end with more than 1.7 million new homes and apartments started—still slightly higher than 1983's total. But most also expect a significant drop next year, to around 1.5 million.

Looking far ahead, analysts figure the '80s and early '90s should be reasonably good for the home building industry, with starts averaging 1.5 million to 1.7 million a year.

The key to housing starts—and the forest industry's prosperity—is interest rates. No one is willing to predict them that far ahead.

—The Editors

and Consumption, 1974-1983 (billion bd ft)

Hardwood Lumber Production, By Regions			Total Hardwood Production	Total Hardwood Consumption	Total Lumber Production	Total Lumber Consumption
Southern	Appalachian	Other				
3.265	1.268	2.371	6.904	6.784	34.097	38.866
2.761	1.109	2.002	5.872	5.791	31.583	36.099
3.033	1.171	2.213	6.417	6.441	35.760	42.194
3.063	1.207	2.410	6.680	6.890	37.667	46.969
3.242	1.228	2.527	6.997	6.997	37.896	48.432
3.452	1.261	2.581	7.294	6.939	37.445	46.292
3.314	1.211	2.533	7.058	6.272	31.858	38.771
3.074	1.309	2.452	6.835	6.479	29.592	36.640
2.362	0.894	1.821	5.077	5.108	26.960	34.496
3.164	0.910	1.647	5.721	5.644	31.479	41.339

Source: National Forest Products Assn.

Comparative data — Top 100 companies — 1974-1983

(Millions of bd ft, hardwood and softwood; includes U.S. and Canada)

Year	Total volume reported by Top 100 Co.'s	Number mills in Top 100	Total volume by year's top producer	Cutoff volume of year's 100th producer	Co.'s producing more than 1 billion bd ft
1974	24,652	589	2,541	65,470	3
1975	22,023	633	2,530	56,500	2
1976	27,978	639	2,702	77,333	4
1977	30,988	645	2,806	85,282	5
1978	32,142	629	2,662	90,634	5
1979	31,599	634	2,955	91,300	4
1980	28,037	641	2,889	80,000	4
1981	26,956	657	2,744	74,580	3
1982	26,043	603	2,147	71,000	4
1983	34,305	610	3,123	98,058	5

Leading lumber producers, U.S. and Canada

(Figures given in bd ft, hardwood and softwood combined)

(Companies ranked according to data received by FOREST INDUSTRIES)

Company & number of mills	Headquarters	'82 Output	'83 Output
1. Weyerhaeuser Co. (33 mills)	Tacoma, Wash.	2,846,000,000	3,123,000,000
2. Georgia-Pacific Corp. (37)	Atlanta, Ga.	1,406,639,000	1,802,308,000
3. Louisiana-Pacific Corp. (66)	Portland, Ore.	1,310,000,000	1,680,000,000
4. Champion International Corp. (23)	Stamford, Conn.	1,012,000,000	1,272,000,000
5. Canfor Corp. (14)	Vancouver, B.C.	768,200,000	1,164,600,000
6. British Columbia Forest Products Ltd. (10)	Vancouver, B.C.	629,000,000	863,000,000
7. West Fraser Mills Ltd. (6)	Quesnel, B.C.	730,967,000	846,585,000
8. Boise Cascade Corp. (18)	Boise, Idaho	635,000,000	844,000,000
9. MacMillan Bloedel Ltd. (10)	Vancouver, B.C.	635,000,000	822,000,000
10. International Paper Co. (13)	Dallas, Texas	627,500,000	760,350,000
11. Weldwood of Canada Ltd. (10)	Vancouver, B.C.	521,000,000	668,000,000
12. Whonnock Industries Ltd. (7)	Vancouver, B.C.	530,000,000	641,000,000
13. Northwood Pulp and Timber Ltd. (4)	Prince George, B.C.	340,749,000	608,138,000
14. St. Regis Corp. (9)	Tacoma, Wash.	447,364,000	583,031,000
15. Sierra Pacific Industries (8)	Redding, Calif.	424,193,000	556,445,000
16. Pope and Talbot Inc. (5)	Portland, Ore.	355,000,000	517,000,000
17. Simpson Timber Co. (6)	Seattle, Wash.	422,000,000	516,000,000
18. Balfour Forest Products Inc. (6)	Prince George, B.C.	273,000,000	496,000,000
19. Roseburg Lumber Co. (5)	Roseburg, Ore.	290,000,000	480,000,000
20. Diamond International Corp. (7)	Red Bluff, Calif.	245,707,000	464,991,000
21. Crown Forest Industries Ltd. (6)	Vancouver, B.C.	383,930,000	456,994,000
22. Westar Timber Ltd., (formerly BC Timber Ltd.) (6)	Vancouver, B.C.	300,966,000	447,753,000
23. Potlatch Corp. (12)	Lewiston, Idaho	399,832,000	434,616,000
24. Publishers Paper Co. (4)	Lake Oswego, Ore.	149,915,000	434,588,000
25. Plum Creek Timber Co. Inc. (13)	Seattle, Wash.	228,098,000	415,922,000
26. Doman Industries Ltd. (5)	Duncan, B.C.	335,000,000	397,000,000
27. Normick Perron Inc. (6)	La Sarre, Que.	338,800,000	358,500,000
28. Continental Group Inc. (9)	Savannah, Ga.	257,000,000	352,000,000
29. Willamette Industries Inc. (9)	Portland, Ore.	230,000,000	315,000,000
30. Eurocan Pulp and Paper Co. Ltd. (3)	Kitimat, B.C.	230,000,000	299,000,000
31. Bohemia Inc. (7)	Eugene, Ore.	264,158,000	295,000,000
32. Southwest Forest Industries (9)	Phoenix, Ariz.	163,636,000	281,964,000
33. W-I Forest Products Inc. (7)	Wilsonville, Ore.	185,000,000	280,000,000
34. Donohue Inc. (4)	Quebec, Que.	147,032,000	278,997,000
35. Union Camp Corp. (9)	Savannah, Ga.	376,500,000	273,600,000
36. Crestbrook Forest Industries Ltd. (3)	Cranbrook, B.C.	182,019,000	272,674,000
37. Hammermill Paper Co. (12)	Erie, Pa.	182,490,000	267,655,000
38. J. D. Irving Ltd. (8)	Saint John, N.B.	200,000,000	250,000,000
39. RSG Forest Products Inc. (3)	Kalama, Wash.	202,038,233	240,511,382
40. Georgia Kraft Co., Woodkraft Division (4)	Peachtree City, Ga.	180,000,000	240,000,000
41. Gilman Paper Co. (4)	Saint Marys, Ga.	200,000,000	240,000,000
42. Crown Zellerbach Corp. (4)	San Francisco, Calif.	245,000,000	234,000,000
43. Pacific Forest Products (3)	Victoria, B.C.	130,000,000	230,000,000
44. Coastal Lumber Co. (15)	Weldon, N.C.	268,108,000	227,500,000
45. Scott Paper Co. (8)	Philadelphia, Pa.	160,197,748	222,673,077

1984 ANNUAL Lumber Review

Company & number of mills	Headquarters	'82 Output	'83 Output
46. Evans Products Co. (3)	Portland, Ore.	147,887,000	222,101,000
47. Stinson Lumber Co. (2)	Portland, Ore.	150,000,000	220,000,000
48. Slocan Forest Products Ltd. (2)	Richmond, B.C.	135,000,000	206,200,000
49. Great Northern Nekoosa Corp. (4)	Stamford, Conn.	161,000,000	198,000,000
50. Clearwater Timber Products (3)	Edmonton, Alta.	150,000,000	190,000,000
51. Mountain Fir Lumber Co. Inc. (4)	Salem, Ore.	134,764,000	187,807,000
52. Pacific Lumber and Shipping Co. (3)	Seattle, Wash.	113,737,421	187,273,922
53. Finlay Forest Industries Ltd.	Mackenzie, B.C.	134,202,000	186,009,000
54. The Pas Lumber Co. Ltd. (1)	Prince George, B.C.	176,645,000	185,657,000
55. Wickes Forest Industries (4)	Dinuba, Calif.	124,172,000	183,194,000
56. Eel River Sawmills Inc. (3)	Fortuna, Calif.	140,916,000	181,947,000
57. Abitibi-Price Inc. (4)	Toronto, Ont.	140,581,000	180,642,000
58. Idaho Forest Industries (4)	Coeur d'Alene, Idaho	110,509,000	173,568,000
59. Tahsis Co. Ltd. (2)	Vancouver, B.C.	130,000,000	168,000,000
60. Timber Realization Co. (6)	Jackson, Miss.	199,267,658	165,341,100
61. E.B. Eddy Forest Products Ltd. (3)	Ottawa, Ont.	144,791,000	165,160,000
62. Federal Paper Board Co. Inc. (2)	Riegelwood, N.C.	115,000,000	165,000,000
63. Saucier Forest Products Ltd. (2)	Comtois, Que.	149,350,000	163,180,000
64. Rustad Bros. and Co. Ltd. (1)	Prince George, B.C.	138,000,000	163,000,000
65. Tolko Industries Ltd. (2)	Vernon, B.C.	136,700,000	161,400,000
66. Forex Inc. (6)	Val D'Or, Que.	140,000,000	145,000,000
67. Ainsworth Lumber Co. Ltd. (2)	Hundred Mile House, B.C.	135,000,000	145,000,000
68. Pinette and Therrien Mills Ltd. (2)	Williams Lake, B.C.	128,129,000	144,229,000
69. Domtar Forest Products (2)	Montreal, Que.	65,034,000	143,129,000
70. Manville Forest Products (2)	West Monroe, La.	81,000,000	141,000,000
71. Jacobson Bros. Forest Products (1)	Williams Lake, B.C.	95,000,000	140,000,000
72. Pacific Lumber Co. (3)	San Francisco, Calif.	119,470,000	138,640,000
73. WTD Industries (3)	Portland, Ore.	43,126,000	137,054,000
74. Lignum Ltd. (1)	Vancouver, B.C.	118,937,000	135,125,000
75. American Forest Products Co. (3)	San Francisco, Calif.	110,000,000	131,000,000
76. Matériaux Blanchet Inc. (2)	Saint Pamphile, Que.	120,000,000	130,000,000
77. Carrier Lumber Ltd. (1)	Prince George, B.C.	62,000,000	127,000,000
78. Kirby Forest Industries Inc. (2)	Houston, Texas	116,833,000	125,440,000
79. Temple-Eastex (2)	Diboll, Texas	106,000,100	122,100,000
80. Cipa Industries Ltd. (2)	Vancouver, B.C.	134,094,000	121,477,000
81. Summit Timber Co. (1)	Darrington, Wash.	95,155,455	121,399,210
82. Owens-Illinois Inc. (3)	Toledo, Ohio	108,500,000	120,000,000
83. S&R Sawmills (3)	Surrey, B.C.	87,000,000	119,748,000
84. Revelstoke Companies Ltd. (4)	Calgary, Alta.	69,000,000	118,000,000
85. Rosboro Lumber Co. (2)	Springfield, Ore.	85,310,000	115,013,000
86. TMA Forest Products (4)	Andalusia, Ala.	91,056,000	111,253,000
87. Joe N. Miles and Sons Inc. (3)	Lumberton, Miss.	70,000,000	110,000,000
88. Bowater Inc. (2)	Albertville, Ala.	81,000,000	110,000,000
89. Willamina Lumber Co. (2)	Portland, Ore.	100,483,000	109,783,000
90. Lakeland Mills Ltd. (1)	Prince George, B.C.	93,065,000	109,596,000
91. Seneca Sawmill Co. (1)	Eugene, Ore.	49,020,000	109,517,000
92. Federated Cooperatives Ltd. (2)	Canoe, B.C.	83,860,000	108,332,000
93. Medford Corp. (2)	Medford, Ore.	89,117,000	105,808,000
94. Fort Apache Timber Co. (2)	Whiteriver, Ariz.	87,661,000	102,701,000
95. ITT Rayonier Inc. (5)	Stamford, Conn.	88,268,000	102,626,000
96. Cattermole Timber Ltd. (2)	Fort Nelson, B.C.	86,000,000	102,000,000
97. Consolidated-Bathurst Inc. (4)	Montreal, Que.	58,810,000	99,560,000
98. F. H. Stoltz Land and Lumber Co. (3)	Columbia Falls, Mont.	56,379,089	99,500,000
99. Northside Lumber Co. (3)	Philomath, Ore.	71,000,000	98,500,000
100. Harwood Products (2)	Willits, Calif.	75,459,000	98,058,000
101. American Timber Co. (1)	Olney, Mont.	59,201,315	93,387,441
102. Hanel Lumber Co. Inc.	Hood River, Ore.	52,900,000	91,815,000
103. Westvaco Development Corp. (2)	Summerville, S.C.	75,000,000	90,000,000
104. Kaibab Industries (3)	Phoenix, Ariz.	81,699,000	89,933,000
105. Brazier Forest Products Inc. (3)	Molalla, Ore.	58,840,000	89,778,000
106. Bennett Lumber Products Inc. (2)	Princeton, Idaho	64,665,596	88,533,106
107. Sun Studs Inc. (1)	Roseburg, Ore.	82,000,000	86,500,000
108. Eugene F. Burrill Lumber Co. (1)	Medford, Ore.	70,289,000	84,276,000
109. Rogge Lumber Co. (2)	Wallowa, Ore.	44,890,000	83,570,000
110. Apollo Forest Products Ltd. (1)	Fort Saint James, B.C.	59,352,108	82,461,071
111. Edward Hines Lumber Co.	Chicago, Ill.	242,529,000	82,074,000
112. Manke Lumber Co. Inc. (2)	Tacoma, Wash.	84,263,135	80,646,659
113. Collins Pine Co. (2)	Portland, Ore.	73,222,000	80,140,000
114. Anthony Timberlands Inc. (2)	Bearden, Ark.	59,541,000	78,555,000
115. Northwest Hardwoods (2)	Portland, Ore.	73,800,000	77,800,000
116. Kimberly-Clark Corp. (2)	Coosa Pines, Ala.	49,386,000	77,085,000
117. Western Construction and Lumber Co. (1)	Edmonton, Alta.	50,000,000	76,000,000
118. Duke City Lumber Co. Inc. (5)	Albuquerque, N.M.	64,000,000	75,000,000
119. Scierie Saint-Michel Inc. (2)	Saint-Michel, Que.	50,000,000	75,000,000
120. P&M Cedar Products Inc. (4)	Stockton, Calif.	—	75,000,000

Leading lumber producers, U.S. and Canada

Company & number of mills	Headquarters	'82 Output	'83 Output
121. Allied Forest Products Inc. (4).....	Portland, Ore.	62,000,000	74,000,000
122. The Langdale Co. (2).....	Valdosta, Ga.	49,089,414	72,101,187
123. Longleaf Forest Products (1).....	Portland, Ore.	68,000,000	72,000,000
124. La Scierie Taschereau (2).....	Taschereau, Que.	80,000,000	70,000,000
125. Ellingson Lumber Co. (1).....	Baker, Ore.	43,158,000	67,053,000
126. Modoc Lumber Co. (1).....	Klamath Falls, Ore.	56,489,000	65,865,000
127. Mayr Bros. Lumber Co. (2).....	Hoquiam, Wash.	65,430,000	65,430,000
128. Gregory Industries Ltd. (2).....	Vancouver, B.C.	70,000,000	65,000,000
129. Deltic Farm and Timber Co. Inc. (2).....	El Dorado, Ark.	19,374,000	64,887,000
130. Raven Lumber Ltd. (1).....	Campbell River, B.C.	39,196,666	64,200,000
131. Great West Timber Ltd. (1).....	Thunder Bay, Ont.	57,500,000	64,000,000
132. Maibec Industries (2).....	Sainte Foy, Que.	60,000,000	64,000,000
133. Brand-S Corp. (1).....	Corvallis, Ore.	42,000,000	63,000,000
134. Scotch Lumber Co. (1).....	Fulton, Ala.	61,000,000	63,000,000
135. Avison Lumber Co. (4).....	Molalla, Ore.	52,884,000	62,495,000
136. Harrigan Lumber Co. Inc. (1).....	Monroeville, Ala.	43,041,864	61,726,052
137. G. W. Martin Lumber Ltd. (3).....	Harcourt, Ont.	40,000,000	60,000,000
138. Scierie Des Outardes (1).....	Hauterive, Que.	—	60,000,000
139. New South Forest Industries (1).....	Conway, S.C.	52,327,000	58,952,000
140. Chesapeake Corp. (5).....	West Point, Va.	43,500,000	58,500,000
141. Bond Bros. Sawmill Ltd. (1).....	Vanderhoof, B.C.	43,500,000	58,000,000
142. Schmidbauer Lumber Co. (2).....	Eureka, Calif.	35,433,000	57,690,000
143. Fort Hill Lumber Co. (1).....	Portland, Ore.	—	57,022,907
144. L&M Lumber Ltd. (1).....	Vanderhoof, B.C.	47,267,363	56,139,198
145. Davidson Industries Inc. (2).....	Mapleton, Ore.	34,700,000	56,025,000
146. The Daaquam Lumber Ltd. (2).....	Montmagny, Que.	35,000,000	56,000,000
147. Nova Lumber Co. Ltd. (1).....	N. Vancouver, B.C.	37,000,000	56,000,000
148. Dubreuil Bros. Ltd. (1).....	Dubreuilville, Ont.	52,000,000	56,000,000
149. Gulf Lumber Co. Inc. (1).....	Mobile, Ala.	52,000,000	55,000,000
150. Fraser Inc. (2).....	Edmunston, N.B.	70,000,000	55,000,000
151. Gerard Crete and Fils Inc. (1).....	Proulxville, Que.	50,000,000	55,000,000
152. Spruce Falls Power and Paper Co. Ltd. (1).....	Kapuskasing, Ont.	50,000,000	55,000,000
153. Bisson and Bisson Inc. (1).....	Matagami, Que.	48,201,310	54,013,102
154. Oregon Cedar Products Co. (2).....	Springfield, Ore.	40,000,000	54,000,000
155. Weiers Sawmill Ltd. (1).....	Quesnel, B.C.	42,000,000	54,000,000
156. Mill and Timber Products Ltd. (1).....	Surrey, B.C.	51,198,286	53,748,530
157. Saskatchewan Forest Products Corp. (2).....	Prince Albert, Sask.	50,866,000	53,735,000
158. Hankins Lumber Co. Inc. (1).....	Grenada, Miss.	—	53,451,921
159. United Sawmill Ltd. (1).....	Hearst, Ont.	37,000,000	53,000,000
160. Alaska Lumber and Pulp Co. Inc. (1).....	Sitka, Alaska	58,029,000	52,833,000
161. Gregory Timber Resources Inc. (2).....	Glendale, Ore.	19,334,685	52,688,500
162. Curt Bean Lumber Co. Inc. (2).....	Amity, Ark.	52,000,000	52,000,000
163. Warm Springs Forest Products Industries (1).....	Warm Springs, Ore.	46,897,198	51,702,896
164. Del-Cook Lumber Co. (3).....	Adel, Ga.	48,304,162	51,475,378
165. Zeidler Forest Industries Ltd. (3).....	Edmonton, Alta.	34,780,000	51,446,000
166. Sooke Forest Products Ltd. (1).....	Victoria, B.C.	—	50,000,000
167. Merritt Bros. Lumber Co. Inc. (1).....	Priest River, Idaho	46,000,000	50,000,000
168. Gorman Bros. Lumber Ltd. (1).....	Westbank, B.C.	49,000,000	50,000,000
169. Buchanan Hardwoods Inc. (5).....	Selma, Ala.	—	50,000,000
170. Anderson-Tully Co. (3).....	Memphis, Tenn.	45,273,179	49,528,631
171. Groot Logging Ltd. (1).....	Smithers, B.C.	50,000,000	49,000,000
172. Spalding and Son Inc. (1).....	Grants Pass, Ore.	46,000,000	48,500,000
173. Portac Inc. (1).....	Tacoma, Wash.	32,331,469	48,126,392
174. Welco Lumber (2).....	Marysville, Wash.	48,000,000	48,000,000
175. Levesque Lumber (Hearst) Ltd. (1).....	Hearst, Ont.	49,192,497	47,999,549
176. Dant and Russell Inc. (2).....	Portland, Ore.	29,428,632	47,903,126
177. H-O Lumber Products Inc. (3).....	Chehalis, Wash.	37,529,000	47,208,000
178. Raoul Guerette Inc. (2).....	Degelis, Que.	40,000,000	47,000,000
179. Sierra Forest Products (1).....	Terra Bella, Calif.	45,000,000	47,000,000
180. Galloway Lumber Co. Ltd. (1).....	Galloway, B.C.	20,000,000	46,000,000
181. Lake Region Lumber Co. (1).....	Casco, Maine	36,548,283	45,428,699
182. Buse Timber and Sales Inc. (1).....	Everett, Wash.	37,010,000	45,111,000
183. AT&N Lumber Service Inc. (3).....	York, Ala.	40,000,000	45,000,000
184. Aspen Planers Ltd. (1).....	Merritt, B.C.	42,000,000	45,000,000
185. Merrill and Ring Inc. (1).....	Port Angeles, Wash.	37,788,644	44,685,030
186. Douglas County Lumber Co. (1).....	Roseburg, Ore.	32,599,000	44,606,000
187. Balfour Lumber Co. Inc. (1).....	Thomasville, Ga.	39,472,780	44,548,570
188. Wetsel-Oviatt Lumber Co. (1).....	Folsom, Calif.	37,781,890	43,878,190
189. Gilchrist Timber Co. (1).....	Gilchrist, Ore.	39,500,000	43,500,000
190. White Swan Lumber Co. Inc. (1).....	White Swan, Wash.	29,905,045	43,050,907
191. Erickson Lumber Co. (1).....	Marysville, Calif.	39,056,000	42,642,000
192. Vanport Manufacturing Inc. (1).....	Boring, Ore.	34,728,000	42,474,000

Company & number of mills	Headquarters	'82 Output	'83 Output
193. Prairie Wood Products (2)	Riddle, Ore.	26,792,000	42,471,000
194. Swanson-Superior Forest Products Inc. (1)	Noti, Ore.	33,241,000	42,067,000
195. Seaboard Lumber Co. (1)	Seattle, Wash.	20,000,000	42,000,000
196. Pinecrest Lumber Co. (1)	Plumerville, Ark.	34,000,000	42,000,000
197. Marys River Lumber Co. Inc. (2)	Corvallis, Ore.	36,000,000	42,000,000
198. Michigan-California Lumber Co. (1)	Camino, Calif.	42,128,000	41,475,000
199. Thompson Hardwoods Inc. (2)	Hazlehurst, Ga.	41,000,000	41,000,000
200. Buchanan Lumber (1)	High Prairie, Alta.	24,383,447	40,787,848
201. Paul Bunyan Lumber Co. (1)	Anderson, Calif.	25,805,000	40,328,000
202. Boyd Lumber Corp. (2)	Sedro Woolley, Wash.	42,000,000	40,000,000
203. Shuqualak Lumber Co. Inc. (1)	Shuqualak, Miss.	31,000,000	40,000,000
204. Caffall Bros. Forest Products (2)	Wilsonville, Ore.	34,000,000	39,360,000
205. Hudson Lumber Co. (2)	Anderson, Calif.	27,000,000	39,000,000
206. Tolleson Lumber Co. Inc. (3)	Perry, Ga.	35,000,000	39,000,000
207. Taylor Lumber Co. (1)	Beaverton, Ore.	18,000,000	38,100,000
208. Mallette Lumber Inc. (1)	Timmins, Ont.	49,000,000	38,000,000
209. Webster Lumber Co. (5)	Wyzata, Minn.	—	38,000,000
210. C&D Lumber Co. (1)	Riddle, Ore.	19,237,000	37,161,000
211. Pine Products Corp. (1)	Prineville, Ore.	33,000,000	37,000,000
212. Navajo Forest Products Inc. (1)	Navajo, N.M.	41,600,000	36,500,000
213. Snider Industries (1)	Marshall, Texas	34,000,000	36,000,000
214. Ochoco Lumber Co. (2)	Prineville, Ore.	32,700,000	36,000,000
215. J&J Log and Lumber Corp. (2)	Dover Plains, N.Y.	32,000,000	36,000,000
216. Owens-Hurst Lumber (1)	Eureka, Mont.	19,765,607	35,393,508
217. Pyramid Mountain Lumber Inc. (1)	Seeley Lake, Mont.	25,475,000	35,347,000
218. Drew Sawmills Ltd. (2)	Malakwa, B.C.	47,862,000	35,016,000
219. Decker Lake Forest Products Ltd. (1)	Burns Lake, B.C.	35,000,000	35,000,000
220. Friesen Lumber Co. (1)	Saint Helens, Ore.	34,000,000	35,000,000
221. Allen Logging Co. (1)	Forks, Wash.	32,485,760	34,626,436
222. Nagel Lumber Co. Inc.	Land O' Lakes, Wis.	23,415,000	34,489,108
223. T. R. Miller Mill Co. Inc. (2)	Brewton, Ala.	30,000,000	34,000,000
224. Connor Forest Industries Inc. (4)	Wausau, Wis.	30,000,000	34,000,000
225. Scierie Landrienne Inc. (1)	Landrienne, Que.	33,000,000	34,000,000
226. Charles Ingram Lumber Co. Inc. (2)	Florence, S.C.	31,007,000	33,770,000
227. SDS Lumber Co. (2)	Bingen, Wash.	27,514,000	33,738,000
228. D. R. Johnson Lumber Co. (1)	Riddle, Ore.	28,470,000	33,662,000
229. Keadle Lumber Enterprises (2)	Thomaston, Ga.	30,235,102	32,563,106
230. Lulumco Inc. (1)	Luceville, Que.	30,615,046	32,560,791
231. Layman Lumber Co. (1)	Naches, Wash.	25,500,000	32,506,000
232. Cone Lumber Co. (1)	Goshen, Ore.	28,339,000	32,253,000
233. Chasse Inc. (1)	Sainte-Marie Beauce, Que.	20,311,474	32,208,642
234. Snider Lumber Products Co. (2)	Turlock, Calif.	31,042,090	32,143,843
235. Columbus Lumber (1)	Brookhaven, Miss.	30,000,000	32,000,000
236. Anthony Forest Products Co. (2)	El Dorado, Ark.	32,000,000	32,000,000
237. Juniper Lumber Co. Ltd. (2)	Juniper, N.B.	18,400,000	31,600,000
238. Beaver Lumber Co. (1)	Clatskanie, Ore.	17,199,633	31,392,602
239. Griffin Lumber Co. (3)	Cordele, Ga.	31,430,952	31,391,398
240. Cliffs Forest Products Co. (1)	Iron Mountain, Mich.	26,319,000	30,689,000
241. Freemont Sawmill Co. (2)	Lakeview, Ore.	28,871,435	30,307,926
242. Marcel Lauzon Inc. (1)	East Hereford, Que.	28,000,000	30,000,000
243. Martin Timber Co. Inc. (1)	Castor, La.	24,000,000	30,000,000
244. Kamiah Mills (1)	Kamiah, Idaho	25,483,304	29,742,679
245. Grant Lumber Co. Ltd. (1)	Elk Lake, Ont.	31,869,536	29,738,756
246. Hi-Ridge Lumber Co. (1)	Yreka, Calif.	21,250,000	29,111,000
247. Kitchens Bros. Manufacturing Co. Inc. (3)	Utica, Miss.	22,985,136	28,658,751
248. Guy Bennett Lumber Co. (1)	Clarkston, Wash.	27,389,081	28,579,023
249. North Florida Lumber Co. Inc. (1)	Graceville, Fla.	—	28,250,000
250. Gray Lumber Co. (1)	Waverly, Va.	25,544,401	28,179,925
251. Inter-State Lumber Co. Inc. (2)	Kingwood, W. Va.	26,000,000	28,000,000
252. H. V. and T. G. Thompson Lumber (1)	Ailey, Ga.	26,200,000	26,800,000
253. Big Valley Lumber Co. (1)	Bieber, Calif.	16,680,970	26,109,117
254. P. E. Barnes Lumber Co. (4)	Hamburg, Ark.	19,177,911	26,030,270
255. Clemons Bros. Lumber Co. (1)	Amite, La.	26,000,000	26,000,000
256. Superior Lumber Co. (1)	Glendale, Ore.	18,800,000	26,000,000
257. A&L Lafreniere Lumber Ltd. (1)	Chapleau, Ont.	19,282,000	25,576,000
258. Walker Bros. Lumber Co. Inc. (1)	Huntsville, Texas	20,000,000	25,000,000
259. W. M. Sheppard Lumber Co. Inc. (1)	Brooklet, Ga.	20,000,000	25,000,000
260. Williams Lumber Co. Inc. (1)	Rocky Mount, N.C.	—	25,000,000
261. North Anson Reel Co. (1)	North Anson, Maine	30,000,000	25,000,000
262. Murray Bros. Lumber Ltd. (1)	Madawaska, Ont.	25,000,000	25,000,000
263. Manitoba Forestry Resources Ltd. (1)	The Pas, Man.	36,000,000	25,000,000
264. J. E. Martel and Sons Lumber (1)	Chapleau, Ont.	20,000,000	25,000,000

Leading lumber producers, U.S. and Canada

Company & number of mills	Headquarters	'82 Output	'83 Output
265. Delta Cedar Products (1).....	Delta, B.C.	25,000,000	25,000,000
266. Averitt Lumber Co. (3).....	Clarksville, Tenn.	20,000,000	25,000,000
267. Tangfeldt Wood Products (1).....	Eugene, Ore.	21,800,000	24,500,000
268. W. W. Lumber Co. (1).....	Cottage Grove, Ore.	24,000,000	24,000,000
269. Rajala Lumber Co. (4).....	Deer River, Minn.	22,000,000	24,000,000
270. C. M. Tucker Lumber Corp. (1).....	Pageland, S.C.	24,000,000	24,000,000
271. Greensboro Lumber Co. (2).....	Greensboro, Ga.	24,000,000	24,000,000
272. Cedar Lumber Inc. (2).....	Mill City, Ore.	24,092,000	23,868,000
273. Moore Mill and Lumber Co. (2).....	Bandon, Ore.	9,551,249	23,404,094
274. Crane Mills (1).....	Corning, Calif.	24,567,028	23,230,612
275. Suwannee Lumber Manufacturing Co. (1).....	Cross City, Fla.	17,323,919	22,904,046
276. Ramsey Lumber Co. (2).....	Suffolk, Va.	23,535,000	22,695,000
277. McNamara and Peepe Lumber Co. (1).....	Crescent City, Calif.	21,251,000	22,575,000
278. Madawaska Lumber (1).....	Carleton, Que.	24,100,000	22,250,000
279. M. C. Dixon Lumber Co. Inc. (1).....	Eufaula, Ala.	12,722,000	22,116,000
280. Varn Wood Products Co. (1).....	Hoboken, Ga.	15,518,000	21,574,844
281. Broughton Lumber Co. (1).....	Underwood, Wash.	16,528,000	21,378,000
282. Newaygo Forest Products Ltd. (1).....	Hearst, Ont.	19,421,962	21,287,468
283. East Alabama Lumber Co. (1).....	LaFayette, Ala.	11,450,000	20,900,000
284. Arcata Redwood Co. (1).....	Arcata, Calif.	21,295,000	20,591,000
285. William Milne and Sons Ltd. (1).....	Temagami, Ont.	16,200,000	20,200,000
286. Cambria Forest Industries (1).....	Newcastle, Wyo.	19,010,000	20,140,000
287. Gulf States Paper Corp. (1).....	Tuscaloosa, Ala.	20,000,000	20,000,000
288. Hinchcliff Products Co. (2).....	Strongsville, Ohio	15,000,000	20,000,000
289. Dudley Lumber Co. (1).....	Salem, Ala.	18,000,000	20,000,000
290. Cascade Locks Lumber Co. (1).....	Cascade Locks, Ore.	18,000,000	20,000,000
291. Calandor Pine Corp. (1).....	Cleveland, Ohio	18,000,000	20,000,000
292. Cersosimo Lumber Co. Inc. (3).....	Brattleboro, Vt.	18,000,000	20,000,000
293. Cuddeback Lumber Co. (1).....	Eugene, Ore.	13,500,000	20,000,000
294. Mebane Lumber Co. (1).....	Mebane, N.C.	—	20,000,000
295. Potomac Supply Corp. (1).....	Kinsale, Va.	20,000,000	20,000,000
296. Kimball International (4).....	Jasper, Ind.	18,250,000	19,750,000
297. Spray Lake Sawmills (1980) Ltd. (1).....	Cochrane, Alta.	12,457,399	19,737,465
298. Hull-Oakes Lumber Co. (1).....	Monroe, Ore.	16,673,000	19,586,000
299. Sundance Lumber Co. Inc. (1).....	Springfield, Ore.	16,025,800	19,556,000
300. St. Johns Forest Products Co. (1).....	Portland, Ore.	5,574,284	19,520,125
301. Neiman Sawmill Inc. (1).....	Hulett, Wyo.	14,280,000	19,473,500
302. Doyle Lumber Inc. (1).....	Martinsville, Va.	16,190,000	19,403,000
303. McCully and Soy Ltd. (1).....	Truro, N.S.	3,149,149	19,232,846
304. H. G. Toler and Son Lumber Co. Inc. (1).....	Leola, Ark.	18,502,131	19,021,121
305. Wade Wood Inc. (1).....	Wade, N.C.	17,000,000	19,000,000
306. Harris Pine Mills (1).....	Pendleton, Ore.	21,000,000	19,000,000
307. Seattle-Snohomish Mill (1).....	Snohomish, Wash.	18,000,000	18,900,000
308. Paxport Mills Inc. (1).....	Tacoma, Wash.	17,693,000	18,879,000
309. Beadles Lumber Co. (1).....	Moultrie, Ga.	14,800,000	18,750,000
310. J. V. Wells Inc. (1).....	Sharptown, Md.	18,688,444	18,585,674
311. Clermond Hamel Ltd. (1).....	Saint Ephrem De Beauce, Que.	—	18,045,000
312. H. W. Culp Lumber Co. (1).....	New London, N.C.	16,000,000	18,000,000
313. T&S Hardwoods Inc. (1).....	Milledgeville, Ga.	9,000,000	18,000,000
314. Zip-O-Log Mills Inc. (1).....	Eugene, Ore.	15,000,000	18,000,000
315. T.J. Moss Lumber Co. Inc. (3).....	Rogersville, Ala.	13,000,000	18,000,000
316. Lakeview Lumber Products Co. (1).....	Lakeview, Ore.	16,840,000	17,534,000
317. Keller Lumber Co. (1).....	Roseburg, Ore.	16,652,699	17,495,769
318. Flippo Lumber Corp. (1).....	Doswell, Va.	15,000,000	17,464,000
319. McShan Lumber Co. (1).....	McShan, Ala.	15,500,000	17,200,000
320. Forest Products Inc. (1).....	Corbin, Ky.	15,000,000	17,000,000
321. A. J. D. Forest Products Inc. (1).....	Grayling, Mich.	15,000,000	17,000,000
322. Hutchins Lumber Inc. (1).....	Weippe, Idaho	12,142,264	16,986,301
323. Consolidated Pine Inc. (1).....	Prineville, Ore.	16,216,250	16,898,940
324. Pacific Studs (1).....	Cimarron, N.M.	15,600,000	16,500,000
325. Herbert Lumber Co. (1).....	Riddle, Ore.	14,343,000	16,336,000
326. Sonoma Pacific Co. (1).....	Oakland, Calif.	13,933,000	16,313,000
327. Claude Howard Lumber Co. (1).....	Statesboro, Ga.	12,191,128	16,164,272
328. Sam Mabry Lumber Co. (1).....	Liberty, Miss.	14,000,000	16,000,000
329. Menominee Tribal Enterprises (1).....	Neopit, Wis.	17,000,000	16,000,000
330. Kitwanga Lumber Co. (1).....	Kitwanga, B.C.	12,000,000	16,000,000
331. Perry Lumber Co. Inc. (1).....	Perry, Fla.	12,261,115	15,481,255
332. Moose River Lumber Co. Inc. (1).....	Jackman, Maine	14,547,830	15,400,177
333. Alton Packaging Corp. (1).....	Alton, Ill.	17,904,698	15,139,327
334. A. B. Carroll Lumber Co. Inc. (1).....	Hurtsboro, Ala.	15,000,000	15,000,000
335. Big Creek Lumber Co. (1).....	Davenport, Calif.	15,000,000	15,000,000
336. Chiloquin Forest Products Inc. (1).....	Chiloquin, Ore.	—	15,000,000

1984 ANNUAL Lumber Review

Company & number of mills	Headquarters	'82 Output	'83 Output
337. Conrad Poulin and Fils Ltd. (1).....	Montmagny, Que.	13,500,000	15,000,000
338. Burt Lumber Co. Inc. (1).....	Washington, Ga.	13,000,000	15,000,000
339. Flodin Lumber and Manufacturing (1).....	Plains, Mont.	13,000,000	15,000,000
340. Newman Lumber Co. Inc. (2).....	Woodsville, N.H.	12,000,000	15,000,000
341. Metcalf Lumber Co. Inc. (1).....	Thomasville, Ga.	14,000,000	15,000,000
342. Precision Pine (1).....	Lakeview, Ore.	12,000,000	15,000,000
343. Pate Lumber Co. Inc. (1).....	Carrollton, Ala.	15,000,000	15,000,000
344. Chesterfield Lumber Co. Inc. (1).....	Darlington, S.C.	11,047,084	14,879,074
345. Collum's Lumber Mill Inc. (1).....	Allendale, S.C.	13,000,000	14,500,000
346. Wood Reels Inc. (1).....	Hartselle, Ala.	13,378,000	14,400,000
347. Trammell Lumber Co. (1).....	La Grange, Ga.	8,837,315	14,160,036
348. Arkansas Oak Flooring Co. (2).....	Pine Bluff, Ark.	11,092,220	14,066,691
349. Carlotta Lumber Co. (2).....	Carlotta, Calif.	11,811,000	14,060,000
350. Dickert Lumber Co. Inc. (1).....	Newberry, S.C.	14,500,000	14,000,000
351. Tigerton Lumber Co. (2).....	Tigerton, Wis.	13,000,000	14,000,000
352. Wiergate Lumber Co. Inc. (1).....	Wiergate, Texas	14,000,000	14,000,000
353. Almond Bros. Lumber Co. (1).....	Coushatta, La.	11,030,820	13,340,300
354. Swift Lumber Inc. (1).....	Atmore, Ala.	10,600,000	13,300,000
355. Troy Lumber Co. (2).....	Troy, N.C.	11,400,000	13,200,000
356. Pitt Timber Ltd. (1).....	Port Coquitlam, B.C.	13,500,000	13,000,000
357. Elliot Sawmilling Co. Inc. (1).....	Estill, S.C.	12,000,000	13,000,000
358. C. B. Lumber Co. (1).....	Hot Springs, Ark.	7,309,930	13,000,000
359. Pine Mountain Lumber Co. (1).....	Yreka, Calif.	—	12,894,000
360. Bear Paw Timber Corp. (4).....	Fryeburg, Maine	11,600,000	12,800,000
361. T. W. Kelly Enterprises Inc. (4).....	Pittsfield, Mass.	11,867,944	12,672,872
362. J. W. Jones Lumber Co. (1).....	Elizabeth City, N.C.	10,474,348	12,618,535
363. Jackson Sawmill Co. Inc. (1).....	Jackson, Ala.	11,000,000	12,500,000
364. Fiest Hardwoods Inc. (1).....	Newton Falls, Ohio	11,500,000	12,500,000
365. H. S. Hoffer and Son Lumber Co. (1).....	Sunbury, N.C.	11,224,201	12,045,187
366. W. L. Sherrod Lumber Co. Inc. (1).....	Greenville, Fla.	12,000,000	12,000,000
367. Sagebrush Sales Co. (1).....	Albuquerque, N.M.	15,000,000	12,000,000
368. Ocala Lumber Sales Co. (1).....	Ocala, Fla.	12,000,000	12,000,000
369. Lytton Lumber Ltd. (1).....	Lytton, B.C.	12,000,000	12,000,000
370. J. M. Jones Lumber Co. Inc. (1).....	Natchez, Miss.	12,000,000	12,000,000
371. Hubert Moore Lumber Co. Inc. (1).....	Alapaha, Ga.	12,000,000	12,000,000
372. Fred Netterville Lumber Co. (1).....	Woodville, Miss.	12,000,000	12,000,000
373. Hamel Forest Products (4).....	Vesper, Wis.	10,985,822	11,728,126
374. McRae Mills Ltd. (1).....	Whitney, Ont.	14,000,000	11,600,000
375. Timberline Lumber Inc. (1).....	Weippe, Idaho	13,867,855	11,574,650
376. Semac Industries Inc. (4).....	Millersburg, Ohio	10,650,000	11,375,000
377. East Perry Lumber Co. (1).....	Frohna, Mo.	10,027,553	11,261,157
378. Umphlett Lumber Co. (1).....	Moncks Corner, S.C.	8,064,000	11,100,000
379. The James MacLaren Industries Inc. (2).....	Thurso, Que.	9,000,000	11,000,000
380. M. J. Corley and Sons (2).....	Lexington, S.C.	9,000,000	11,000,000
381. Fleming Lumber Co. (1).....	Crestview, Fla.	4,000,000	11,000,000
382. Parton Lumber Co. (1).....	Rutherfordton, N.C.	9,000,000	10,980,000
383. Toney-Thayer Lumber Co. (2).....	Louisburg, N.C.	8,810,627	10,370,758
384. Copiah County Manufacturing Co.	Hazlehurst, Miss.	8,000,000	10,000,000
385. Bellerive Ka'n'enda Woods Products (1).....	Mont-Laurier, Que.	3,000,000	10,000,000
386. E. Sondheimer Co. (1).....	Sondheimer, La.	8,000,000	10,000,000
387. United Timber Corp., Highland Lumber Co. Div. (1).....	Dixfield, Maine	9,000,000	10,000,000
388. Great Western Lumber Co. (1).....	Everson, Wash.	7,435,000	9,880,000
389. Dean Lumber Co. (1).....	Gilmer, Texas	9,041,936	9,654,165
390. Butler Lumber Co. Inc. (1).....	Chase City, Va.	—	9,500,000
391. Mitkof Lumber Co. Inc. (1).....	Petersburg, Alaska	14,100,000	9,200,000
392. Hanna Manufacturing (1).....	Winnfield, La.	6,000,000	9,000,000
393. Koppers Co. Inc., Forest Products Group (1).....	Pittsburgh, Pa.	8,500,000	8,500,000
394. Indiana Wood Products Inc. (1).....	Middlebury, Ind.	6,719,821	8,337,276
395. Aiken Lumber Co. (2).....	Aiken, S.C.	7,500,000	8,300,000
396. Butler Land and Timber Co. Inc. (1).....	Chase City, Va.	7,947,000	8,200,000
397. Atchley Lumber and Supply Inc. (1).....	Trinity, Texas	—	8,000,000
398. Lumbee Timber Co. Inc. (1).....	Laurinburg, N.C.	8,000,000	8,000,000
399. Spruce Products Ltd. (2).....	Winnipeg, Man.	8,000,000	8,000,000
400. W. T. Jones and Sons Inc. (1).....	Ruther Glen, Va.	7,500,000	8,000,000
401. Pruitt Lumber Co. (1).....	Louisburg, N.C.	6,814,304	6,623,157
402. Seaman Timber Co. Inc. (3).....	Montevallo, Ala.	6,000,000	6,000,000
403. Augusta Lumber and Supply Inc. (3).....	Staunton, Va.	3,883,000	4,245,251
404. East Brainerd Lumber Co. Inc. (1).....	Chattanooga, Tenn.	4,000,000	4,000,000
405. L&K Lumber (Northshore) Ltd. (1).....	N. Vancouver, B.C.	30,719,000	3,484,000
406. Johnston and Rhodes Bluestone (1).....	East Branch, N.Y.	2,500,000	2,500,000
407. Aldenville Dimension Wood Products Inc. (1).....	Aldenville, Pa.	1,500,000	1,800,000
408. Pacific Forest Products Inc. (1).....	Haines, Alaska	5,753,000	500,000

OCTOBER 1984

FOREST LOGGING/PULPWOOD/FORESTRY/LUMBER/PANELS INDUSTRIES



Steep, rugged North Cascades
offer little room for a landing

OCTOBER

Industry

20

Sawmillers can profit by knowing market trends

Getting lumber from mill to market is becoming increasingly complex, especially in light of changes in the ways lumber is sold and used

Mills

30

Modernization project improves sawmill's total product line

Custom-built log sorting system and in-house electronics helps Varn Wood Products, Hoboken, Ga., boost production and recovery

34

Worker-owned firm relied on staff to design and build mill

North Pacific Plywood in Graham, Wash., a cooperative, has finally moved to its new mill. Interrupted by two depressions, the move took 10 years



Cover story, page 16

Woods

16

'We have some of the best Doug fir on the West Coast'

G & D Co. Inc. in Darrington, Wash., harvests a variety of western softwoods to supply company's mill. As many as 10 high-lead sides go at once in rugged Cascade Range forests

18

Well-manufactured logs are 'only thing we have to sell'

One way to avoid problems with public timber sale contracts is to log on your own land, says John Meek, Olympia, Wash., who owns about 60% of the land he logs

24

Delimber bunches stems; two heads boost production

'Two heads are better than one,' says SLR, designer of a two-head mechanical delimber. Tests prove the unit can boost production

29

Choppers yarded out logs as big as 6 ft in diameter

A logging team from Columbia Helicopters Inc. and a flight crew from Alaskan Helicopters Inc. recently harvested nearly 3 million bd ft of timber near Ketchikan, Alaska

32

Logging family teams up to coordinate harvesting

Three loggers who used to work independently formed a team — Bethell Logging of Sheridan, Ore. — to harvest second-growth timber

Departments

5

Washington

9

For the Record

39

Tips from Tommy

40

Equipment

44

Books, Bulletins

45

Machinery Row

46

Meetings

48

Newsmakers

Getting lumber from mill to market is becoming an increasingly complex job, especially in light of changes in the ways lumber is sold and used

Sawmillers can profit by knowing market trends

Moscow, Idaho

At both the wholesale and retail levels, major trends are reshaping the ways lumber flows from the mill to the final user in the domestic market. Sawmillers who understand these trends can take advantage of them.

The information presented here is based on interviews with sales and marketing executives at the mill, wholesale, and retail levels in various parts of the country over the past several years. It's also based on interviews by six of my graduate students in our forest industries Master of Business Administration program at the University of Oregon.

These students recently interviewed a representative sample of lumber retailers in the Eugene-Springfield area and in eight of the smaller towns in the Willamette Valley and on the Oregon Coast. Secondary sources of material have also been analyzed, including government and trade association figures and reports, and articles and forecasts in both trade journals and general business publications.

Five uses dominate market

A look at the total consumption of softwood in the U.S. shows five major market segments (see table). At 37% of consumption last year, conventionally constructed homes constitute the largest segment of the lumber market.

Housing starts totaled close to 1.7 million. Single-family homes accounted for 78% of the total, and multi-family, 22%. Incidentally, in 1982, when housing starts were only slightly over 1 million, conventionally-built homes constituted 28% rather than 37% of lumber consumption.

Factory-built housing includes both mobile homes and modular homes. Modular homes are those made of various-sized modules which are pre-built in wall units, floor panels, and roof trusses programmed for on-site assembly. Such homes are also likely to use pre-assembled plumbing trees, heating plants, and kitchen units.

Although constituting only 5% of the domestic market for lumber in 1983, factory-built housing seems likely to increase more rapidly in the future. There

By Stuart U. Rich

are two primary reasons for this.

Affordability is first. For example, the average price of a mobile home in early 1984 was \$21,800, compared with an average conventional single-family new house price of \$93,900, which by mid-1984 had become about \$100,000. It is also estimated that the average U.S. family's monthly home payment totals one-third of its income, and that about 70% of today's households cannot afford an 80% mortgage on an average-priced conventional home.

Big-builder importance grows

The second factor favoring the increase in factory-built housing is the increasing importance of the big builders. It was the medium-sized builders who were hardest hit during the recent recessions. The small custom builders were able to switch to the repair and remodeling market when mortgage money became expensive and scarce.

The well-capitalized big builders increased their market share by tapping the national capital markets for low-cost financing for their customers. They could trim construction costs by "downsizing": building smaller homes and using more factory-assembled units.

Of significance to both lumber mills and lumber wholesalers are the special needs of the manufactured housing industry. These producers have production deadlines to meet and do not stock large forest products inventories. Thus, they require on-time deliveries, both direct mill shipments and truckloads from close-in distribution yards. These shipments often call for special items such as 2x3 8-ft $\frac{1}{2}$ -in. studs and 2x6 12-ft floor joists.

Non-residential construction, constituting 18% of the total market, consists of low and medium-height commercial, industrial, agricultural, and institutional buildings, plus public utilities and highway construction.

The repair and remodeling market, accounting for 22% of lumber consumption in 1983, has shown remarkable stability since 1970. In contrast with the

ups and downs of the residential construction market, it has averaged about 20% of the total during this period.

The three major categories within the repair/remodel market are additions and alterations; upkeep (or maintenance and repair); and rehabilitation and renovation. Current estimates indicate that the do-it-yourselfers represent about half of the repair and remodeling market. Professional remodelers and contractors make up the other half, although the contractors use somewhat more lumber than do-it-yourselfers.

A growth market for repairs

This market, less sensitive to interest rate changes than new residential construction, shows promise of continued growth. This was highlighted by Census Bureau data for 1980 which showed that the total housing stock of the nation was 92 million dwelling units. About 45 million of them were single-family houses 20 or more years old—prime candidates for upkeep and improvement.

Finally, industrial uses for wood constituted 18% of the total 1983 market. These uses fall in three major categories: products manufactured for resale, such as furniture, fixtures, signs, and transportation equipment; materials handling, such as pallets, crates, and bins; and plant repair and maintenance, such as shelves, partitions and remodeled offices. With the continued strong economy, demand in all of these segments should increase.

Channels for distributing plywood and other panel products are basically the same as those for lumber. Mills sell to different types of wholesalers and brokers, who in turn sell to dealers who specialize in selling to builders or to the general public.

Wholesalers and brokers

Merchant wholesalers are independent firms which purchase from manufacturers for resale to dealers or retailers for industrial users. They take title to the goods they purchase and may or may not carry stock.

Manufacturers' sales branches and sales offices are establishments maintained by the manufacturers for market-

ing their products at the wholesale level. Captive wholesale distribution centers are also included in this category.

Agents, brokers and commission merchants are rather like the merchant wholesalers, except that they do not take title to the products. They perform only the sales function, and typically do not carry stock.

Cooperative buying offices are maintained by a group of dealers or retailers who pool orders so that they can buy in quantity from mills and drop-ship partial carloads to the various yard locations of the dealer-members.

Types of retailers

Construction supply dealers carry large inventories of bulky materials such as lumber, plywood, hardboard and gypsum, which they sell at near-wholesale prices to big-volume builders and contractors. These dealers may be involved in the manufacture of millwork items, such as cabinets and window frames, as well as roof trusses and wall panels.

Dealer-builders sell building materials and also engage in either custom or speculative building of homes, farm buildings, major room additions, and general remodeling, using either their own or subcontracted crews.

Home improvement centers, also called home centers, are dealers or retailers who sell, chiefly to homeowners, a wide range of building materials and other products used for adding to, repairing, renovating, and maintaining the home.

Full service dealers carry a complete line of building products, including appliances and kitchen cabinets, and serve both homeowners and builders. Service is emphasized, including design, cost estimating, and financing for small home builders.

Mass merchandisers are retail institutions from outside the building materials field, including department stores. They may have home improvement or building supply departments in their regular stores, or may have chains of separate building supply centers.

How many wholesalers and how many retailers are we talking about? The most recent Commerce Department figure (1982) for lumber, plywood and millwork wholesalers (SIC5031) was 6928. This figure includes all of the wholesaler types mentioned except the cooperative buying offices, which have come to prominence only recently.

As for retailers, the 1982 figure for lumber and other building materials dealers (SIC521) was 24,940. This figure includes all the retailer types except the mass merchandisers.

Changes affecting distribution

Some significant changes are affecting these channels of distribution.

The *high cost of working capital* has

U.S. softwood lumber consumption (1983) (million bd ft)		
Residential construction (conventional)		
Single-family (78%)	10,215	
Multi-family (22%)	2,884	
Total	13,099 (37%)	
Residential construction (factory-built)		
Modular (62%)	1,205	
Mobile homes (38%)	745	
Total	1,950 (5%)	
Non-residential construction	6,370 (18%)	
Repair and remodeling		
Contractor (73%)	5,840	
Do-it-yourself (27%)	2,160	
Total	8,000 (22%)	
Industrial uses	6,510 (18%)	
Grand total	35,929 (100%)	

caused retail building materials dealers to push the inventory-carrying function back to the wholesale level. The number of stocking wholesalers is increasing because retailers prefer to buy in smaller amounts closer to their time of sale. They buy from nearby stocking distributors, who are either independent merchant wholesalers or large manufacturer-owned distribution branches.

Lumber mills selling to the large distribution yards of these two types of channel members ship chiefly straight carloads of lumber. The stocking wholesalers are providing more services to the retailers than they used to, including breaking of unit loads, offering specified lengths, more frequent delivery, and more use of mixed trucks which make many stops on one haul.

The next trend, *decline in non-stocking wholesalers* (also known as "office wholesalers"), has been caused by several factors. First is the shift of the inventory-carrying function back up to the wholesale level, as well as the desire by retailers for more wholesaler services.

Transit selling declines

The second factor is the decline in transit selling, an important part of the business of office wholesalers. This decline has been caused by the fact that the new rail rate structure has been designed around direct shipments.

In addition, demurrage and various transit charges for milling in transit, sorting in transit, diversion, and reconsignment have doubled or tripled in the last eight years. The third factor is the decreased dependence of the mills on the non-stocking office wholesaler to move their production of volume items.

The larger manufacturers may sell through their own distribution branches

or through the retailers' cooperative buying offices. The smaller mills, traditionally dependent on the office wholesaler, have simply declined in number. For example, according to Bureau of Census figures, the number of sawmills and planing mills in the country decreased from 12,189 in 1963 to 7544 in 1977, and to 5881 in 1981, the most recent figure available.

The more profitable of the office wholesalers remaining today are those who emphasize special orders of non-commodity items aimed particularly at industrial users. Examples of such items produced by mills in the U.S. Inland Region are Douglas fir and larch machine-stress-rated lumber for glulam stock, tongue-and-groove decking and scaffolding, and ponderosa pine uppers for the furniture market, with the lower grades going to wood treaters.

Specialties boost profits

Specialty goods such as these, sold through office wholesalers, have enabled some of the Inland mills to remain profitable in the face of the U.S. market inroads made by the spruce-pine-fir commodity items from the Canadian mills.

The third trend, *increase in manufacturers' sales branches*, is part of an overall pattern of forward integration by the major lumber producers. Today, 15 of the top 20 U.S. lumber producers have captive wholesale distribution centers.

There are a number of reasons behind this trend. Some end-market-oriented firms, producing finished paneling and other consumer-type products on which they spend large sums for advertising, have moved into wholesale and even retail distribution in order to get closer to the final users and improve the information flow between producer and ultimate consumer.

This is particularly important when seeking to gain market acceptance for new products. Other firms, which produce mainly commodity items, and are strongly timber-resource oriented, view their move into wholesale distribution as a way to get maximum return from the firm's timber assets. This relationship between timber assets and captive distribution of wood products is well illustrated by one leading company.

It states its overall corporate mission as being "a resource company which grows and harvests trees to make and sell wood products." It then goes on to describe its marketing and distribution strategy as one designed to "provide an optimum flow and mix of orders for maximum conversion efficiency and utilization of timber resources."

Similarly, another company with a strong nationwide system of distribution centers views its marketing strategy as devising a logistics system which will

Trends at the wholesaler level

1. Increase in stocking wholesalers.
2. Decline in non-stocking (office) wholesalers.
3. Increase in manufacturers' sales branches.
4. Increase in remanufacturing wholesalers.
5. Increase in reloading operations.
6. Increase in cooperative buying offices.
7. Decline in agents, brokers and commission merchants.
8. Increased importance of traffic management.

"generate volume sales and achieve cost-effectiveness in delivering the products." In other words, these companies consider their captive distribution outlets as part of a total "materials flow system" from forests to end users.

More services offered

These manufacturer-owned distribution centers have greatly expanded the services they offer to retailers.

In our recent survey in the Eugene-Springfield area, retailers mentioned the following services as being available to them when they bought from the distribution centers: willingness to quote firm prices over a period of time to large customers; willingness to precision end-trim, regrade material, custom resaw, and break units; willingness and ability to make trusses, to prehang doors, handle specialty items and millwork; and willingness to carry construction-related non-wood products such as gypsum, roofing, and insulation.

There appeared to be a big increase in local retailers' use of manufacturer-owned distribution branches during the recent recession.

The fourth trend, *increase in remanufacturing wholesalers*, has resulted from the emphasis on maximum utilization of increasingly scarce or expensive raw materials, such as cedar, plus the increased importance of the repair/re-model, light commercial construction and industrial markets.

Examples of remanufactured items include channel siding, cedar paneling, and subflooring for decks above exposed glulam beams.

Some wholesalers, such as small office wholesalers, although not adding remanufacturing facilities themselves, have made cooperative arrangements with small reman plants. Such a wholesaler-reman team might produce and sell specialties, with the wholesaler acting as both a source of lumber supply for the remanufacturer and as a seller of the output of the reman plant.

The fifth trend, *increase in reloading operations*, is evidenced by the growing number of mixed car shipments. It is related to the increase in the number of

wholesale distribution yards located at considerable distance from the mills in order to be close to retailers in major market areas.

The reloading function may be performed by the producers with their own wholesale branches, by the independent wholesalers, or by companies engaged primarily in the reloading business itself. Of increasing importance among reloading companies are the border point transit yards in eastern Canada.

These yards receive railroad shipments of spruce-pine-fir dimension lumber from western Canada, then reload the boards onto trucks in small-volume mixed loads, with specific tallies, to match the short-lead-time inventory needs of dealers in eastern Canada and in the U.S. Midwest and Northeast.

The sixth trend, *increase in cooperative buying offices* (sometimes referred to as "programmed wholesalers"), has been in response to the needs of dealers who emphasize do-it-yourselfers, rather than contractor-based dealers.

These cooperative groups are retailer-owned, engage in volume buying from the mills, and offer a wide range of promotional and management services to their members. Smaller chains and independents can pool their bargaining power to get lower prices through quantity discounts.

The seventh trend, *decline in agents, brokers, and commission merchants*, has been caused by the increasing reliance of retailers on nearby stocking wholesalers, both independent and manufacturer-owned, as noted earlier. For lumber needs that cannot be served by these local wholesalers, the smaller retailers are turning from brokers to buying co-ops.

Rail deregulation's effects

An eighth trend, *increased importance of traffic management*, has been caused by deregulation, consolidation of railroad lines, and increased competition between different lumber species from different producing regions.

In an effort to recapture some of the forest products traffic lost to trucks and Canadian rail lines, U.S. carriers have

offered special single-line rates, with minimum-sized shipment requirements for western lumber bound for certain destinations in the Midwest and South.

Reload centers, as described earlier, have grown up around these destinations, from which lumber is distributed to dealers by truck. Shipments from the West may also go on a Canadian line to a destination such as Buffalo, N.Y., then be rebilled at a special rate on a U.S. line down to a reload center, say, in Atlanta, Ga., and then go by truck to dealers.

Sharp negotiations for more favorable transportation rates have helped some western producers in their battle to retain their eastern U.S. markets being invaded by Canadian spruce-pine-fir and southern pine. This has resulted in traffic departments playing an increasingly important role in the operations of the western wholesalers. In fact, on many sales, the traffic specialist's ability to obtain the best routings and freight rates has meant the difference between profit and loss.

Trends at the retailer level

The first trend in the retail business, *increase in home improvement centers*, is the response of dealers to the increasing importance of the repair and remodeling market described earlier. To help dealers serve this market, a number of studies have been made of what the home improvement customers expect from the building materials dealers.

The major factors, listed in order, which attract them to particular stores are: service, quality, and selection of merchandise; prices consistent with the service and quality offered; and the general layout of the store, including the way the merchandise is presented.

The merchandise offered by the typical home improvement center includes dry lumber, priced by the piece, in shorter, pre-cut lengths of 3 to 7 ft and displayed on the sales floor.

The second trend, *increase in full service dealers*, refers to the increasing number of retailers who serve both homeowners and builders. While the requirements of the two types of customers are somewhat different in terms of size of sale, type of assistance needed from sales clerks, extension of credit, and breadth of product line, most of these full service dealers (often called "building materials centers" today) can provide additional benefits to their customers as a result of this dual marketing strategy.

The retail customer likes to know that the same materials the professional uses are available for his project. The contractor knows that the building materials center, with its display of a wide range of finishing hardware, light fixtures, and wall coverings, can make it simpler to "customize" a house or re-

modeling project for the prospective owner. New product demonstrations, more extensive product displays, and manufacturers' information "fairs" benefit contractors and consumers.

Keeping contractor-customers

In spite of these synergistic effects, however, there are a number of measures which the more-successful full service dealers, as well as some home improvement centers, have taken to avoid alienating their old contractor customers when they have expanded their operations to serve the retail consumer business.

Separate store entrances, parking spaces, and service desks are provided. Near the contractor service desk may also be a dispatch desk to expedite the loading of the contractor's truck or the delivery of large purchases to the jobsite. A special credit staff may be available, since the contractor typically buys on credit, while the retail consumer often pays cash at a separate checkout counter. Because he buys in larger volume, the contractor often gets a 10% discount on all his purchases. Often the two operations will be headed by different persons: a retail store manager and a sales manager for contractors.

The third trend is *decline in construction supply dealers*. A major reason for this trend is that many of the firms that used to cater entirely to contractors have added retail operations to serve the do-it-yourself homeowners.

In other words, they have become full service dealers or home improvement centers, as just described. Those that have remained construction supply dealers differ from the full service dealers and the home improvement centers in several respects. They carry a narrower product line, sell in larger volume at a lower markup, buy more of their materials direct from the mill, have less investment in showroom and displays, spend less on advertising, have fewer personnel per dollar of sales, and have a higher stock turnover rate.

In the Eugene-Springfield area in 1983, the construction supply dealers averaged seven turns per year, compared with five turns for the full service dealers and four turns for the home improvement centers. The majority of lumber sold at the retail level in this area went through the construction supply dealers, whereas the majority of plywood and panel products went through the full service dealers and the home improvement centers.

'Combination' dealers increase

The fourth trend, *increase in combination-type dealers*, has already been suggested in the discussion of the first three trends, where we saw contractor-oriented dealers expanding their businesses to serve the homeowners.

Besides the construction supply dealer-home improvement center combination, there are also some dealer-builder-home center types of retailers. In the smaller towns in our study, we sometimes found even greater overlap between types of retailers.

For example, one retailer we interviewed normally did 50% of his sales to consumers and 50% to contractors. But when demand was slack, or inventories had built up, this retailer built homes and farm buildings. In the Eugene-Springfield area there were also a number of wholesaler-retailer combinations, such as a retailer who served the local market, but had a backroom subsidiary which operated an office wholesale operation on a nationwide basis.

Another type of combination was a stocking wholesaler, either independent or manufacturer-owned, who also sold building products at retail to both contractors and homeowners.

The final trend, *decline in mill-direct sales to retailers*, has been caused by the following factors: increase in home improvement centers which purchase from nearby stocking wholesalers; increase in sales by the mills through their own field sales branches and distribution centers; and the increasing use by retailers of cooperative buying offices.

Who are successful distributors?

The recent recession has provided a good test of the efficiency of the many types of wholesalers and retailers in serving these markets.

Quite a number have fallen by the wayside in recent years, but others have survived and some have prospered, despite the fact that housing starts in 1982 reached their lowest point in the post-World War II period. Among the survivors, the more profitable firms at both the wholesaler and the retailer levels shared certain characteristics of effective distribution performance.

The first characteristic, a *clear concept of the company's business*, was based on a size-up of the company's strengths and weaknesses, an assessment of local competition, plus an awareness of current trends in market demand and distribution methods.

As a result of careful study of these three factors, one office wholesaler was able to carve out a profitable market niche in cedar siding and cedar specialties in light commercial construction. This wholesaler noticed that in certain communities in certain parts of the country, there were an increasing number of offices, medical clinics, and other low-rise commercial buildings being located in residential areas.

To make these buildings blend in with the surrounding homes, the architects and builders were trying to give them a rustic look, and had become interested in using cedar siding and cedar

paneling. Through his personal contact with architects, builders, and dealers in these areas, the wholesaler was able to develop a good business in cedar.

Serve your customers

The second characteristic of effective distribution performance was *attention to customer service*. The example just cited illustrates this.

Many wholesalers whom we have interviewed stated that a major reason for their survival during the recent recession was their ability to maintain a loyal clientele. Their dealer-customers, in turn, stated that a major reason for staying with a particular wholesaler was dependable service.

The third factor in effective performance was *inventory control*. Control meant close attention to the turnover rate of all items stocked, and only carrying those items with a high rate of turnover, or a high profit margin that could justify a low number of turns.

Credit control was another key factor in staying alive during the recession. Many of the firms that went under were carrying too many large customers who either didn't pay, or went under themselves. The example of Wickes Corp. is well known.

The fifth characteristic, *sales forecasting*, is related both to customer service and to inventory control. Having stock on hand for prompt shipment when needed, yet avoiding excess inventory to keep the turnover rate up, obviously requires good forecasting of the rate of demand for various items.

A final characteristic of the successful firms over the long term was *financial planning* to maximize the turnover of capital invested.

Use cash efficiently

A basic requirement here is the efficient use of cash so that current needs can be met without tying up idle funds that might be invested in the business, or without having to resort to excessive borrowing to tide over peak seasonal needs. A simple way of budgeting cash needs is through a continually updated cash receipts/disbursements forecast.

This includes keeping careful track of the turnover of accounts receivable and merchandise inventory, since the longer customers take to pay, or the more slow-moving inventory there is on hand, the lower is the turnover of capital invested in the business and hence the lower the rate of return. ■

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